

REPORT
OF THE
NEW JERSEY STATE
MUSEUM
1910

GEOLOGICAL SURVEY OF NEW JERSEY.

A MAP OF NEW JERSEY 1910.

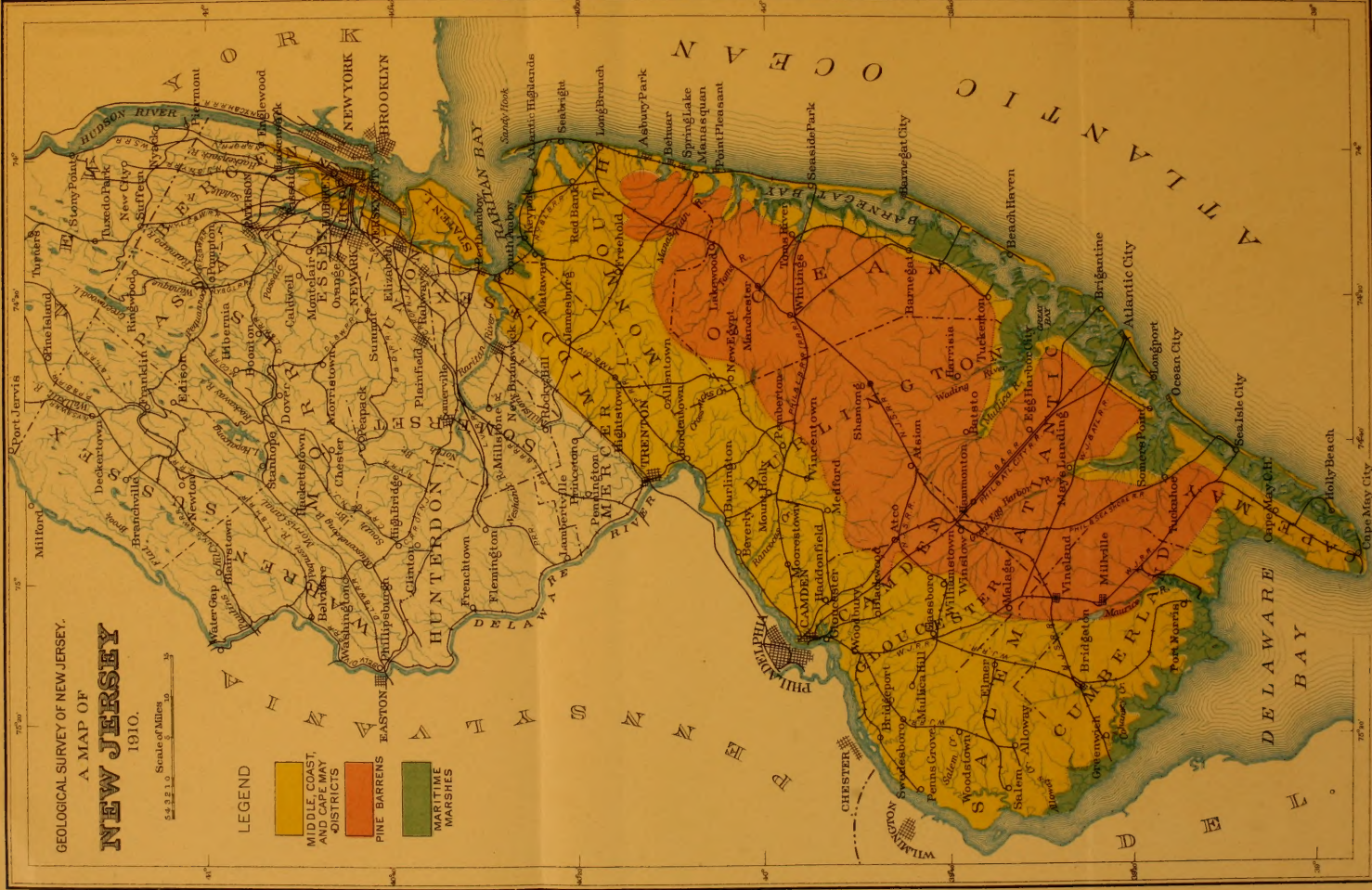
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LEGEND

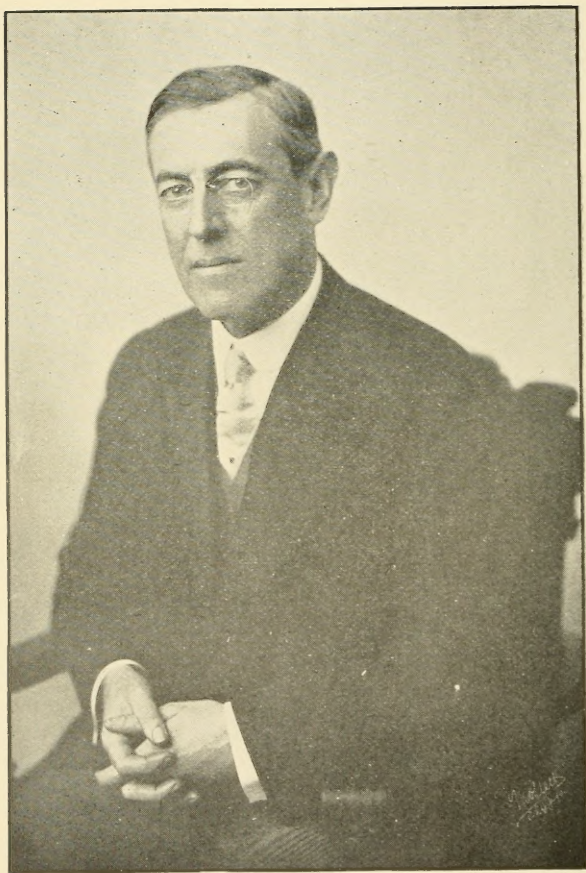
MIDDLE, COAST,
AND CAPE MAY
DISTRICTS

PINE BARRENS

MARITIME
MARSHES







WOODROW WILSON
Governor of New Jersey

ANNUAL REPORT
OF THE
NEW JERSEY STATE
MUSEUM

Including a Report of the Plants of Southern
New Jersey, With Especial Reference to
the Flora of the Pine Barrens.

1910

TRENTON, N. J.
MacCrellish & Quigley, State Printers, Opposite Post Office.

1911.



ANNUAL REPORT

OF 1910

NEW JERSEY STATE MUSEUM

Institution of the Board of Education
New Jersey State Museum
Department of the State

1910



PART I.

(3)



Commissioners of the New Jersey State Museum.

STATE SUPT. OF PUBLIC INSTRUCTION, CHARLES J. BAXTER, *President.*

STATE GEOLOGIST, HENRY B. KÜMMEL, *Secretary.*

PRESIDENT STATE BOARD OF AGRICULTURE, E. B. VOORHEES.

PRESIDENT OF THE SENATE, JOSEPH S. FRELINGHUYSEN.

SPEAKER OF THE HOUSE OF ASSEMBLY, HARRY P. WARD.

SILAS R. MORSE, *Curator.*

Heads of the Several Departments of the New Jersey State Museum.

C. J. BAXTER, STATE SUPERINTENDENT OF PUBLIC INSTRUCTION,
Educational.

E. B. VOORHEES, RUTGERS COLLEGE,
Agriculture.

HENRY B. KÜMMEL, STATE GEOLOGIST,
Geology.

JOHN C. SMOCK, EX-STATE GEOLOGIST,
Forestry.

JOHN B. SMITH, STATE ENTOMOLOGIST,
Entomology.

JAMES T. MORGAN, DEPUTY OF BUREAU OF LABOR STATISTICS,
Manufactures.

WILLIAM H. WERNER, *Taxidermist of Museum.*

HERBERT M. LLOYD, SECRETARY OF GEOLOGICAL SURVEY,
Archæology.



Letter of Transmittal.

TRENTON, N. J., November 30th, 1910.

*To the Honorable John Franklin Fort, Governor
of the State of New Jersey:*

SIR.—I have the honor to present, for the Commissioners of the New Jersey State Museum, the annual report, including a Report on The Plants of Southern New Jersey, with especial references to the Flora of the Pine Barrens.

SILAS R. MORSE,

Curator.

Curator's Report.

For the educational part of our Report for 1910, we have taken a subject that will, we think, be not only interesting, but beneficial, to our schools, and to a large number of people of the State.

It is well known that the Flora of Southern New Jersey is an interesting subject, one that should to a certain extent be taught in our public schools. We have had many requests for information on this subject, but have never been able to give any printed work giving the information desired. To present this subject we have selected a gentleman who has made a study of it for many years, one whose statements can be relied upon, Mr. Witmer Stone of the Academy of Natural Sciences, of Philadelphia, Pa., who gave us such good reports on the Mammals, and the Birds, their Nests and Eggs.

Our intention was to publish with this report a paper on the Fresh and Salt Water Shell Fish of New Jersey, but we found that it would make too large a volume, so have concluded to defer that subject until 1911 for our next Annual Report. It is to be compiled by Mr. Silas C. Wheat, who has devoted much time to this subject in collections and study.

The Report for 1908, "The Birds, Their Nests and Eggs," has met with much praise and has been in great demand. It is used as a reference book in most of the public schools. It was placed in nearly all of the public school libraries and State Public Libraries. We exchange reports with a great many of the United States Departments at Washington, and with many of the Public Museums and institutions similar to our own, and also with several of the principal colleges and libraries in the United States. We are thus collecting a valuable library for the New Jersey State Museum.

The demand for some of our reports in several of the State Libraries has been so great that we have supplied them with several copies of the same report.

We have been assured by many superintendents and teachers that the reports have awakened a great interest on the subjects of which they treat.

VISITORS.

There has been a decided increase in the number of visitors in the past year at the museum. A large number of the school teachers have brought their classes to see and study the specimens of natural history. It is still visited by many of the Normal and Model School students for study of the many specimens. It is considered a great help to have such an institution to visit and study.

THE COLLECTIONS.

The collections of New Jersey minerals is one of the best and most complete in the State, containing a great many specimens. We have had the minerals re-arranged and labeled, which makes it much more interesting and beneficial to the student.

The collection of birds of New Jersey is quite extensive. There are only a very few of the specimens that we do not have, and that number is getting smaller very fast. We hope to have nearly all by another year.

We have added several new specimens to the Mammal collection until there are only a very few species that are not represented by a specimen. One of the recent additions is a very young deer, which was only five days old when it died. We were able to get this specimen through the courtesy of the Chairman of the Fish and Game Commission of the State of Maine, as we did several groups of beavers and other specimens. This Commission has always been very kind to New Jersey, which is greatly appreciated by the management of the Museum.

MORE ROOM NEEDED.

We have urged the need of more room in several of our other reports, but as yet do not see when we will get it. Last winter

the Legislature made an appropriation to buy more land, which we think has been purchased, and we hope our prospects for additional room is brighter than last year. That it will come sometime is our prayer.

If we could have the room necessary the Museum could be made much more useful and interesting. We are so crowded now that the specimens cannot be displayed to an advantage. If they could be, the value of the Museum would be greatly enhanced. Although we have very valuable exhibits from the educational exhibits for the past thirty-two years, yet for the want of room they cannot be shown properly; therefore, much of the benefit they would give is lost.

The intention of the Museum Commission was to have more work from the schools each year, which we now are unable to get for the want of space to display it. It also intended to have a department of agriculture and manufacture, but for the same reason, want of room, we cannot carry it out. Take one branch of manufacture, the Potteries, could make one of the best and most interesting exhibits in the Museum. The same could be said of many other New Jersey industries. New Jersey is rich in its manufactures and its agricultural products.

List of Publications Received.

- The Vertebrates of the Cayuga Lake Basin, N. Y. Cornell University.
- The Trees and Birds, Free Public Library of Newark, N. J.
- Proceedings of the American Association of Museums for 1909.
- Park Museum Bulletin for Nov.-Dec. 1909, Roger Williams Park.
- The Apteryx for January, 1905, Roger Williams Park Museum.
- The Apteryx for April, 1905, Roger Williams Park Museum.
- The Apteryx for July, 1905, Roger Williams Park Museum.
- Monograph No. 14, Check List of the Birds of Rhode Island, Roger Williams Park Museum.
- Monograph No. 15, The Reptiles and Batrachians of Rhode Island, Roger Williams Park Museum.
- Monograph No. 17, The Land and Fresh Water Shells of Great Britain, Roger Williams Park Museum.
- Bulletin No. 1, September, 1904, Instructions for Collection and Mounting Insects, also a Check List of the Coleoptera of the State of Rhode Island, U. S. A., Roger Williams Park Museum.
- Bulletin No. 1, October, 1904, A Numbered Check List of North American Unionidæ, Roger Williams Park Museum.

12 REPORT OF NEW JERSEY STATE MUSEUM.

- Bulletin No. 3, November, 1904, Preparation and Use of Kerosene Emulsion, Roger Williams Park Museum.
- Bulletin No. 4, December, 1904, The Making of an Herbarium, Roger Williams Park Museum.
- Bulletin No. 7, March, 1905, The Metropolitan Park System of Providence, Roger Williams Park Museum.
- Bulletin No. 8, April, 1905, Check List of the Minerals of Rhode Island, Roger Williams Park Museum.
- Bulletin 9, May, 1905, The Cambrian Deposits of North Attleboro, Roger Williams Park Museum.
- Bulletin 10, June, 1905, The American Osprey, Roger Williams Park Museum.
- Bulletin 11, July, 1905, Water-Mites and How to Collect Them, Roger Williams Park Museum.
- Bulletin 12, August, 1905, Unios of New England, Roger Williams Park Museum.
- Bulletin 13, September, 1905, Sphingidæ of Rhode Island, Roger Williams Park Museum.
- Forty-first Annual Report of the Trustees of the American Museum of Natural History, New York.
- American Museum Journal, Vol. 9, American Museum of Natural History, New York.
- American Museum Journal for January, 1909, American Museum of Natural History, N. Y.
- American Museum Journal for February, 1909, American Museum of Natural History, N. Y.
- American Museum Journal for March, 1909, American Museum of Natural History, N. Y.
- American Museum Journal for April, 1909, American Museum of Natural History, N. Y.
- American Museum Journal for May, 1909, American Museum of Natural History, N. Y.
- American Museum Journal for October, 1909, American Museum of Natural History, N. Y.
- American Museum Journal for November, 1909, American Museum of Natural History, N. Y.
- American Museum Journal for December, 1909, American Museum of Natural History, N. Y.
- The Collection of Minerals, American Museum of Natural History, N. Y.
- North American Ruminants, American Museum of Natural History, N. Y.
- The Musical Instruments of the Incas, July, 1903, American Museum of Natural History, N. Y.
- The Insect-Calls of the Vicinity of New York City, October, 1904, American Museum of Natural History, N. Y.
- The Reptiles of the Vicinity of New York City, July, 1905, American Museum of Natural History, N. Y.
- The Batrachians of the Vicinity of New York City, October, 1905, American Museum of Natural History, N. Y.
- The Birds of the Vicinity of New York City, April and July, 1906, American Museum of Natural History, N. Y.

- A Guide to the Sponge Alcove, October, 1906, American Museum of Natural History, N. Y.
- The Foyer Collection of Meteorites, December, 1907, American Museum of Natural History, N. Y.
- The Habitat Bird Groups, February, 1909, American Museum of Natural History, N. Y.
- The Indians of Manhattan Island and Vicinity, September, 1909, American Museum of Natural History, N. Y.
- Stokes Paintings Representing Greenland Eskimo, November, 1909, American Museum of Natural History, N. Y.
- American Museum Journal, January, 1910, American Museum of Natural History, N. Y.
- American Museum Journal, February, 1910, American Museum of Natural History, N. Y.
- American Museum Journal, March, 1910, American Museum of Natural History, N. Y.
- American Museum Journal, April, 1910, American Museum of Natural History, N. Y.
- American Museum Journal, May, 1910, American Museum of Natural History, N. Y.
- American Museum Journal, October, 1910, American Museum of Natural History, N. Y.
- American Museum Journal, January, 1908, American Museum of Natural History, N. Y.
- American Museum Journal, February, 1908, American Museum of Natural History, N. Y.
- American Museum Journal, March, 1908, American Museum of Natural History, N. Y.
- American Museum Journal, April, 1908, American Museum of Natural History, N. Y.
- American Museum Journal, May, 1908, American Museum of Natural History, N. Y.
- American Museum Journal, October, 1908, American Museum of Natural History, N. Y.
- American Museum Journal, November, 1908, American Museum of Natural History, N. Y.
- Annual Report of the American Museum of Natural History, N. Y., 1900.
- Annual Report of the American Museum of Natural History, N. Y., 1901.
- Annual Report of the American Museum of Natural History, N. Y., 1902.
- Annual Report of the American Museum of Natural History, N. Y., 1903.
- Annual Report of the American Museum of Natural History, N. Y., 1904.
- Annual Report of the American Museum of Natural History, N. Y., 1905.
- Annual Report of the American Museum of Natural History, N. Y., 1906.
- Annual Report of the American Museum of Natural History, N. Y., 1907.
- Oyster Culture, Experiments and Investigations in Louisiana, Bureau of Fisheries, Washington, D. C.
- Chemical and Biological Survey of the Waters of Illinois, University of Illinois, September, 1909.
- Bulletin of the Houston Museum and Scientific Society, 1910.

14 REPORT OF NEW JERSEY STATE MUSEUM.

- Fortieth Annual Report of the American Museum of Natural History, 1908.
Bulletin of the Charleston Museum, Vols. 1-5, 1905-1909.
Stala Vystava Skolskav Praze, Jeji vznik a vyvoj Od R. 1879 do R. 1909.
Bulletin No. 3, of the Wistar Institute of Anatomy and Biology, Metal-
Glass Museum Cases of the Wistar Institute.
Penn. Museum and School of Industrial Arts, 34th Annual Report.
Michigan Geological and Biological Survey, 1910, 'The Crawfishes of Michi-
gan, The Insect Calls of Michigan, The Birds of School Girl's Glen
Region, Ann Arbor, Mich, and A Preliminary List of the Sites of
Aboriginal Remains in Michigan.
Museum of the Brooklyn Institute of Arts and Sciences, Report for 1909.
Victoria, British Columbia, Guide to Anthropological Collection in the
Provincial Museum.
Catalogue of the Frederick Gallatin, Jr., Collection of Books on Ornithology.
Report of the Manual Training and Industrial School for Colored Youths.
State Board of Education of N. J., 55th Annual Report and Catalogue of
the State Normal School, at Trenton, N. J.
Catalogue of Canadian Birds, Canada Department of Mines, Geological
Survey Branch.
University of Illinois Bulletin, November 14, 1909, Register 1909-1910.
University of Illinois Bulletin, December 12, 1909, Test of Timber Beams.
Bulletin of Charleston Museum, Vol. 5, No. 8, December, 1909.
Report of Curator of University of Michigan Museum, December, 1909.
Annotated List of The Birds of Point Pelee, R. A. Taverner.
Report of the Field Museum of Natural History, December, 1909.
The Anura of Ithaca, N. Y., A Key to Their Eggs, January, 1909.
The Increase of Austral Birds at Ithaca, January, 1910.
University of Illinois, Agriculture Experimental Station, Circular 140.
University of Illinois, Agriculture Experimental Station, Bulletin 143.
Further Observations on the Nervous System of the American Leopard
Frog, Compared with that of the European Frogs, Wistar Institute,
February, 1910.
A Mathematical Treatment of Some Biological Problems, Wistar Institute,
February, 1910.
On The Lengths of the Internodes in the Sciatic Nerve of Rana Temporalis
and Rana Pipiens; Being a Re-examination by Biometric Methods of
the Data studied by Boycott and Takahashi, Wistar Institute, February,
1910.
Museum News, Central Museum, Eastern Parkway, Brooklyn, N. Y.
The Zoological Bulletin, Penn. Department of Agriculture.
Proceedings of the Boston Society of Natural History, February, 1910.
Bulletin of the Charleston Museum, February, 1910.
Twenty-seventh Annual Report of the Public Museum of Milwaukee,
February, 1910.
The Numismatist, March, 1910.
Second Biennial Report, Louisiana State Museum, 1910.
Bulletin of Charleston Museum, March, 1910.
University of Illinois Bulletin, March, 1910.
The Zoological Bulletin, Penn. Department of Agriculture, March, 1910.

- Museum News, Central Museum, Eastern Parkway, Brooklyn, N. Y., 1910.
 Bulletin of N. Y. Zoological Society, March, 1910.
 The Numismatist, April 1, 1910.
 Bulletin of Charleston Museum, April, 1910.
 Notes on Some of the Rarer Birds of Washtenaw County, Michigan University.
 A Synoptic List of the Fishes known to Occur Within Fifty Miles of Chicago, Field Museum of Natural History, April, 1910.
 Further New Mammals from British East Africa, Field Museum of Natural History, April 7, 1910.
 Bulletin of the Penn. Museum, Fairmount Park, Philadelphia, Pa., April, 1910.
 The Zoological Bulletin, Penn. Department of Agriculture, April and May.
 On the Percentage of Water in the Brain and in the Spinal Cord of the Albino Rat, Wistar Institute, April, 1910.
 Museum News, Central Museum, Eastern Parkway, Brooklyn, N. Y., April.
 Bulletin of the Wisconsin Natural History Society, April, 1910.
 Introduction of the Hungarian Partridge into the United States, U. S. Department of Agriculture, 1910.
 Private Game Preserves and Their Future in the United States, U. S. Department of Agriculture, May, 1910.
 Progress of Game Protection, U. S. Department of Agriculture, May, 1910.
 Bulletin of the Charleston Museum, May, 1910.
 University of Illinois Bulletin No. 34, May, 1910.
 Field Museum of Natural History, Publication 144, May, 1910.
 Bulletin of the New York Zoological Society, May, 1910.
 Bulletin of the Public Museum of Milwaukee, Vol. L, Article 1, June, 1910.
 The Numismatist, June, 1910.
 The Effects of Various Fixatives on the Brain of the Albino Rat, With an Account of a Method of Preparing this Material for a Study of the Cells in the Cortex, Wistar Institute, June, 1910.
 Academy Notes, Buffalo Fine Arts Academy, July, 1910.
 A Naturalist in the Straits of Magellan, C. H. Townsend.
 Bulletin of the N. Y. Zoological Society, July, 1910.
 Bulletin of the Penn. Museum, Fairmount Park, Philadelphia, Pa., July, 1910.
 The Numismatist, July, 1910.
 University of Michigan Bulletin.
 Bulletin of the Wisconsin Natural History Society, July, 1910.
 University of Illinois Bulletin, August, 1910.
 U. S. Department of Agriculture, Circular 74.
 Game Laws for 1910, U. S. Department of Agriculture, September, 1910.
 The Numismatist, September, 1910.
 Notes on Michigan Reptiles and Amphibians, A. G. Ruthven.
 Report Upon the Progress of the Biological Work of the Michigan Geological and Biological Survey, A. G. Ruthven.
 Museum News, Central Museum Eastern Parkway, Brooklyn, N. Y., October, 1910.

16 REPORT OF NEW JERSEY STATE MUSEUM.

Bulletin of the Penn. Museum, Fairmount Park, Philadelphia, Pa., October, 1910.

Bulletin of Charleston Museum, October, 1910.

The Logical Point, October, 1910.

The Logical Point, November, 1910.

Museum News, Central Museum, Eastern Parkway, Brooklyn, N. Y., November, 1910.

Addition to the Museum Specimens by Purchase.

BIRDS.

Set of Flamingoes.
Bald Eagle.
Philadelphia Vireo, M. & F.
Western Sandpiper.
American Golden Plover, M.
Hairy Woodpecker, M.
Traills Flycatcher.
Orchard Oriole.
Vesper Sparrow.
Swamp Sparrow.
Dickissel.
Bank Sparrow.
Rough Winged Swallow.
Warbling Vireo.
Orange Crowned Warbler.
Wilson's Warbler.
Sharp-billed Marsh Wren.
Wilson's Thrush.
Redhead, M.
Long-billed Curlew, F.

BIRD EGGS.

Cooper's Hawk.
Short Eared Owl.
Whip-poor-Will.
Chuck-will's Widow.
Olive-sided Flycatcher.
American Magpie.
Bobolink.
Brewers Blackbird.
Purple Finch.
American Goldfinch.
English Sparrow.
Field Sparrow.
Painted Bunting.
Migrant Shrike.
Red-eyed Vireo.

White-eyed Vireo.
Black-throated Green Warbler.
Maryland Yellow-throat.
Carolina Wren.
Blue-gray Gnatcatcher.
Western Robin.
Murre.
Gadwall.
Baldpate.
American Bittern.
Great-blue Heron.
American Egert.
Green Heron.
American Avocet.
Gambles Partridge.
Ground Dove.
American Osprey.
Sharp-shinned Hawk.
Wilson's Snipe.
Dowitcher.
Ruff.
Belted Kingfisher.
American Sparrow Hawk.
American Hawk Owl.
Skylark.
Cowbird.
Baltimore Oriole.
Red-cockaded Woodpecker.
Red-bellied Woodpecker.
Henslow's Sparrow.
Blue Grosbeak.
Blue Winged Warbler.
Kentucky Warbler.
Brown Thrasher.
Long-billed Marsh Wren.
Double-Crested Comorant.
Water Thrush.
Carolina Wren.
White-breasted Nuthatch.

Tufted Titmouse.	Black & White Creeping Warbler.
Cerulean Warbler.	Chestnut-sided Warbler.
Pine Warbler.	Cedar Bird.
Canadian Warbler.	American Robin.
House Wren.	Crimson Finch.
Pintail.	Wilson Thrush.
Brown-headed Nuthatch.	Indigo Bird.
Purple Finch.	Goldfinch.
Glaucous Scull.	Whip-poor-Will.
Northern Parula Warbler.	Red-eyed Vireo.
Carolina Chickadee.	Brown Thrush.
Rose-breasted Nuthatch.	King Bird.
Leach's Petrel.	Yellow Warbler.
White-crowned Sparrow.	Blue Jay.
Semi-palmated Plover.	Maryland Yellow Throat.
Mocking Bird.	Red-winged Blackbird.
Wood Thrush.	Black-billed Cuckoo.
Cardinal Bird.	Oven Bird.
Green Heron.	Barn Swallow.
Black-crowned Night Heron.	Phoebe.
Ruffed Grouse.	Baltimore Oriole.
English Sparrow.	Cat Bird.
White-bellied Sparrow.	Chick-a-dee.
King Fisher.	Flicker.
American Redstart.	Bobolink.
Ruby-throated Hummingbird.	Eave Swallow.
Red-eyed Vireo.	*Downy Woodpecker.
Bank Swallow.	
Grass Finch.	
Blue Bird.	
Chebec.	
Wood Pewee.	
Chipping Sparrow.	
Goldfinch.	
Summer Yellow Bird.	
American Crow.	
Red-shouldered Hen Hawk.	
Song Sparrow.	

MAMMALS.

Fawn.
 Albino Virginia Deer.
 2 Red Squirrels.
 Weasel.
 2 Moles.

FISH.

Gar Fish.

Prof. Austin C. Apgar died March 4th, 1908.

Three years have passed. When his death came so suddenly the thoughts that occurred to every one were of how much he would be missed from the different activities with which he had been so intimately associated: the Normal School where he had taught for over forty years, the scientific associations with which he had worked, the authors' circle in which he had been an

attractive figure, the church where he had worshiped, and the social circle that he had illumined.

The three years that have passed have given opportunity for the emotions of grief to soften and yield a place to the clearing recognition of his actual service in bringing the public mind to a better understanding of that which is—relatively speaking—of real value in education.

Prof. Apgar came to his thoughtful period in young manhood at a time when the general character of education in all of the schools was largely abstract, categorical, given to symbols. Very much time was spent in calling letters and sounds and words in language and numbers and problems in mathematics and in talking a great deal about traditions and fancies that had come as an inheritance to the schools from the old philosophies and fictions, and very little time was given to the study in any satisfactory manner of the real problems with which the pupil was surrounded and which were to make up the substance of his actual life.

Prof. Apgar's young mind had what would be termed a practical bent. He was born "close to nature" in a country place. The first objects that presented themselves to his awakening senses were the trees, the flowers, the birds, and the animals of the field, and the first problems that presented themselves to his mind were the solution of the uses of these objects of nature. He as naturally turned to these problems as a flower turns its face to the sun. It should be said of him that he was never a student of books, always a student of nature. Others went on field excursions as a matter of theory, and for the accomplishment of a special purpose. He was born in the fields. He could not tear himself from them, and his greatest delight was in leading others to them.

There is at this time a large and growing demand for a more practical education, a nearer approach to real things, whether in mechanics, agriculture, horticulture, or social organization. As one studies and appreciates this demand and lends his sympathy and support to it, how Prof. Apgar's practices and teachings come back with renewed force and significance. His plant lessons, in which the children were taught to see the actual processes

of germination, what moisture in fertilization and soil conditions meant to growing vegetation, were suggestions of the greater movements and activities of the universities and scientific societies of to-day in their efforts through the pure food laws, and so forth, to establish through chemical analyses the values of fertilizers in restoring the exhausted qualities of the soils, and in producing through irrigation, grafting, exchanging of seeds, and so on, the adaptation of conditions to needs, and the relations of soils to products.

This illustration of the suggestiveness of his work in plant life was paralleled in his studies of animal life, their foods, their habits, their uses.

Prof. Apgar belonged to the school of instructors who are now classed as formalists simply because they were really the discoverers and found it necessary to spend much time in naming and classifying the various objects of interest. In this capacity he was a pioneer in bringing to notice very much of that which is now recognized as true of the flora, the plants, the trees, and the fish life, and birds and other animals of our State, but over and above what he did in contributing to the benefits of mankind in directing them to see real uses and real adaptation, his personality will stand out in his recognition of real art in nature, and of the Divine Being in his works.

JAMES M. GREEN.

Prof. Apgar was one of the strongest advocates and promoters for the establishment of the New Jersey State Museum. He was one of the best and most successful educators New Jersey has ever had. As the head of the Department of Birds and Flora, he did very excellent work in this department of the Museum. As a true friend and an enthusiastic worker, we have known him personally for more than forty-five years. None knew him but to love him. His death was a great loss to the State and to the Museum.

S. R. MORSE,
Curator.

PART II.



THE PLANTS
OF
SOUTHERN NEW JERSEY

With Especial Reference to the
FLORA OF THE PINE BARRENS

And the Geographic Distribution
of the Species

By WITMER STONE

Curator Academy of Natural Sciences of Philadelphia,
Fellow of the American Ornithologists' Union,
Member Philadelphia Botanical Club.

TRENTON, N. J.

1911.



PREFACE.

The writer began his botanical studies in Chester County, Pennsylvania, under the guidance of the classic *Flora Cæstrica* of Dr. Darlington, and was fairly familiar with the plant life of this portion of the Piedmont country before he ever visited the Coastal Plain to the eastward. The first trip to the Pine Barrens, at Egg Harbor City, July 21, 1889, he will probably never forget. It was one of those delightful little excursions of botanists which, once a week, left Philadelphia for a day's tramp, under the leadership of the late Dr. J. Bernard Brinton. Nearly everything was new, and the contrast between the flowers of this wonderful Pine country and the more prosaic flora of Pennsylvania's agricultural district made an impression and started an inquiry that were largely responsible for the production of the present volume.

Other work, however, interfered for some years with the prosecution of botanical studies of any sort, and it remained for a joint meeting of the Philadelphia and Torrey Botanical Clubs, at Toms River, July 4th, 1900, to provide the stimulus which led to definite plans for a Flora of the Pine Barrens. The interim had witnessed a wonderful change in the status of American botany. The *Illustrated Flora* had appeared, and under its stimulus botanists were even daring to find new species right at home and to describe them as new, without regard to what Gray's Manual might have to say on the subject. The old solid board field-presses, covered with oilcloth and provided with carpet-bag handles, which had superseded the historic vasculum at the time of the Egg Harbor trip, had been supplanted by light slat presses, and, instead of carrying into the field twenty-five felt dryers and a like number of folders and exhausting one's gray matter in deciding just which twenty-five plants we should select for specimens, we now carried afield only folders

or single sheets, but enough to enable us to preserve 150 specimens, if necessary.

The writer's collections and notes on the South Jersey plants accumulated rapidly, and the arrangement of the data was fortunately well under way when Professor Morse offered to publish them, as part of his annual Museum Report. The basis of the present work is the field work of the author and his friends, the South Jersey material in the herbaria listed below and the published records contained in the several botanical works dealing with the region. Wherever possible, an actual herbarium specimen is cited for every locality mentioned under each species, so that questions of correct identification can readily be settled in the future by consulting this material. This plan has been followed even in the cases of common species, since general statements leave much to be desired that is sometimes supplied by actual records. The number of records is, however, no index to the relative abundance of a species, this matter being covered by the preliminary statement based upon much additional field data. The statements regarding the occurrence and abundance of the wide-ranging species in northern New Jersey, are taken direct from Britton's Catalogue. Published records not backed by actual specimens cannot well be ignored, and they have, in nearly all cases, been included in the text. When they have been proven to be wrong, or seem exceedingly doubtful, they are referred to in foot-notes, and where there seems no reason to question their accuracy they are included with the other records, but distinctly marked as to their source. In rare cases of exceedingly difficult groups where such records are of no particular additional value to the definite knowledge already possessed, and where the exact application of the names used is in doubt, they have been omitted.

LIST OF HERBARIA.

Academy of Natural Sciences.—The Local Herbarium covering roughly an area of seventy miles around Philadelphia, was begun in 1891, upon the founding of the Philadelphia Botanical Club, by the donation of a collection belonging to Isaac C. Mar-

tindale, one of the founders of the club. The members immediately began to contribute specimens, the most important South Jersey collections coming from J. H. Grove, of New Egypt; Charles D. Lippincott, of Swedesboro; and Benjamin Heritage, of Mickleton; other contributors being Dr. J. Bernard Brinton, Albrecht Jahn, Charles S. Williamson.

Soon after, Dr. Ida A. Keller presented her entire local herbarium. Of later years, extensive collections were made by Sam'l S. VanPelt and Bayard Long, while numerous contributions were received from Edwin B. Bartram, Dr. John W. Eckfeldt, W. A. Poyser, Henry A. Lang, Francis W. Pennell, Stewardson Brown, George W. Bassett, Witmer Stone. Upon the death of the veteran botanist, Mr. Charles E. Smith, his entire collection of local plants was bequeathed to the Academy and added to the herbarium.

The general herbarium of the Academy contained New Jersey material collected by all the famous botanists from the time of Nuttall and Pursh down, but outside of Nuttall's collection and those of S. W. Conrad, of Burlington, and Dr. Joseph Carson, and W. Wynne Wister, there were probably no complete herbaria, the specimens being duplicates or special donations. Such material was received from Diffenbaugh, Pickering, Read, Durand, Z. Collins, A. H. Smith, Canby, Parker, and Burk. Later on, the valuable local herbaria of Stewardson Brown, Joseph Crawford and Alexander MacElwee, were presented to the Academy, all rich in South Jersey material, while C. F. Saunders presented a number of specimens.

In 1910 and 1911, all of the local material in the general herbarium was incorporated in the local herbarium, which has thus become one of the most complete and extensive local collections in America.

Since 1903, this local herbarium has been under the care of Mr. S. S. VanPelt, aided during the past two years by Mr. Bayard Long, both of whom volunteered their services and have brought the collection to its present high standard. The thousands of plants which they have themselves collected, and which Mr. Van Pelt has so carefully mounted, are unsurpassed as herbarium specimens.

The South Jersey material contained in this herbarium has been carefully estimated at 14,000 sheets. For permission to avail myself of its riches, I am under obligations to the Academy and the Club and for various aid and assistance, to Mr. Stewardson Brown, Conservator of the Botanical Section in charge of the Academy's herbaria, and to Messrs. VanPelt and Long.

Princeton University.—Comprises the collection of Mr. Charles F. Parker, one of the best authorities on the flora of the Pine Barrens, and a number of other New Jersey plants, received from various sources. Mr. Parker's herbarium contains probably 3,000 specimens from the region covered by the present report, including nearly all those which served as the basis for the records published in Britton's catalogue, on the authority of Parker. The majority of the specimens were carefully examined, especially those mentioned by Britton. For this privilege I am indebted to Prof. George Macloskie.

Philadelphia College of Pharmacy.—This contains the herbarium of Mr. Isaac Martindale, containing a great many New Jersey specimens, only a small portion examined.

University of Pennsylvania.—This herbarium contains the private herbaria of Dr. Joseph Leidy, Dr. J. Bernard Brinton, Isaac Burk, all of them rich in South Jersey plants, and valuable collections made by Dr. J. M. Macfarlane and Dr. John W. Harshberger. There are approximately 3,500 specimens from our region.

For permission to examine this collection I am indebted to the last two gentlemen.

New Jersey Geological Survey.—This herbarium, preserved at New Brunswick, consists of some 5,000 sheets, probably half of them from our area, and forms the basis of Dr. N. L. Britton's catalogue of New Jersey plants published by the survey in 1883. Prof. B. D. Halstead gave me every facility for making a careful examination of the collection.

State Museum, Trenton, N. J.—Two important herbaria belong to this institution. (1) That of Mr. C. S. Gross, formerly of Landisville, containing about 2,000 sheets of plants from this vicinity, Pancoast, Pleasant Mills, Mays Landing, etc. (2) That of Prof. Austin P. Aggar, formerly of Trenton.

Torrey Botanical Club.—Contains probably 2,000 sheets from within our range.

Witmer Stone.—A local herbarium containing 5,000 sheets of southern New Jersey plants, obtained during the past ten years. Many of the collections were made in company with Mr. Van Pelt and other members of the Philadelphia Botanical Club, and much of the material is duplicated in the Academy's herbarium.

Bayard Long.—A herbarium of the plants of Long Beach Island, comprising 2,000 specimens. Most of Mr. Long's collections have been presented to the Academy, but this series he has retained for study.

Benjamin Heritage.—Contains a full series of plants from the country about Mickleton and a number from other parts of our region.

Charles D. Lippincott.—A fine series of the plants of Swedesboro and vicinity and many from other parts of southern New Jersey.

O. H. Brown.—A very full collection of the plants of lower Cape May County, probably 2,500 specimens.

Portions of the herbaria of *Dr. Thos. S. Githens*, of Philadelphia (since presented to the Academy); *Dr. Joseph Stokes*, of Moorestown; *Messrs. M. and A. N. Leeds*, and *Mr. C. S. Williamson*, of Philadelphia, have also been examined.

Number of sheets of southern New Jersey plants examined in connection with the preparation of this report:

Academy of Natural Sciences, Philadelphia, ...	14,000
Herbarium of Witmer Stone, ...	5,000
N. J. State Herbarium, New Brunswick, ...	2,000
N. J. State Herbarium, Trenton, ...	1,000
Herbarium Torrey Botanical Club, ...	1,000
Herbarium of Princeton University, ...	2,000
Herbarium of University of Pennsylvania, ...	2,000
Herbarium of Bayard Long, ...	2,000
Herbarium of Chas. D. Lippincott, ...	1,000
Herbarium of Benj. Heritage, ...	1,000
Herbarium of O. H. Brown, ...	1,000
Herbaria of Dr. Thos. S. Githens and others, ...	1,000
	33,000

Much field work has been planned and carried out in connection with the preparation of this report, which has resulted in the addition of many thousands of specimens to the herbaria of the Philadelphia Academy and the writer, and added greatly to his understanding of the several botanical regions here considered and their relationships.

At the time of Dr. Brinton's weekly field trips, certain historic localities were visited year after year, with the object of obtaining special desirable species known to occur there. The distribution of the various plants appealed more especially to the writer, and he realized the necessity of broader field work in order to secure data for this line of study. He therefore made efforts to visit as many new localities each year as possible, selecting spots that from their location on the map looked promising. This work was ably seconded later by Messrs. S. S. Van Pelt and Bayard Long. Some of these excursions proved barren of results, but the majority added many additional stations for plants hitherto known from only a few localities. The collecting of common species was prosecuted quite as diligently as the search for rarities, since the herbaria were lamentably weak in their representation of well-known plants. The collecting of series of specimens of the same species was not considered desirable in the old days, and the writer well remembers his good friend and preceptor, Mr. John H. Redfield,* conservator of the Academy's botanical collections, carefully examining the herbarium to see if there might be room on a sheet to mount an additional duplicate that had been recently obtained. If there were not, the specimen was generally rejected rather than use up a new sheet of mounting paper. One cannot but wonder what the older botanists would have thought of the vast herbaria of to-day, in which "genus covers" have been supplanted by "species covers," so rapidly has material accumulated.

The accompanying map will show approximately the country covered by the field work of Messrs. Van Pelt, Long and the

* 1815-1895. To Mr. Redfield's generous care the preservation of the many valuable herbaria at the Academy is largely due. He devoted many years of his life gratuitously to their care and arrangement at a time when such attention was imperative. Cf. Torrey Bull. XX. 162 for sketch of his life.

writer, from 1900 to 1910, inclusive. Some localities were visited many times and at all seasons, others only once or twice, but constantly increasing knowledge of the conditions governing plant life in this region usually made it possible to determine whether or not additional trips were worth while.



Fig. 1.—Field work of Messrs. Van Pelt, Long and Stone, 1900-1910, indicated by heavy black lines. Circles indicate ground covered by resident botanists.

The north central and northeastern portions of our area have been least studied, mainly because of their remoteness from Philadelphia, and also because their flora has but little bearing upon that of the Pine Barrens, with which this report is more

especially concerned. Further exploration of upper Monmouth and Burlington Counties would probably only add to the number of stations for the more boreal species, known to straggle down into the coastal plain, and would increase our knowledge of the true flora of the latter region but little.

At certain stations within our range we have been fortunate enough to have resident botanists who have become authorities on the plants of their home neighborhood, and who, by their collections (referred to above) and cordial co-operation, have rendered valuable assistance in this work—Messrs. J. H. Grove, of New Egypt; Benjamin Heritage, of Mickleton; Charles D. Lippincott, of Swedesboro; George W. Bassett, of Hammonton, and O. H. Brown, of Cape May.

The writer has made a rather exhaustive study of the flora about Medford, where, in conjunction with some fellow-naturalists, he has maintained a cabin camp for some ten years past, to which trips of two to four days' duration have been made at all seasons of the year and 750 specimens collected.

Mr. Bayard Long has made a similar study of the flora of Long Beach Island, where he has a summer home. Some 109 days have been spent here during the past few years and a collection of 2,000 specimens obtained.

Several wagon trips from Medford to the Plains have been taken by the writer and some fellow-naturalists, one of a week's duration, others of two or three days, and two visits of several days' duration were made to Farmingdale in May and July, 1910, by Messrs. S. Brown, B. Long, VanPelt and Stone, of the Philadelphia Botanical Club, and Mr. Norman Taylor, of the Torrey Club.

With the exception of the above the collecting trips have been one-day affairs. Trips made by Messrs. Long, VanPelt and Stone during the past ten years number 329; some were individual trips, others were participated in by two or three, while additional members of the Philadelphia Botanical Club often took part, especially Messrs. Stewardson Brown, Charles S. Williamson, Dr. J. W. Eckfeldt, Francis W. Pennell, George W. Bassett and O. H. Brown, to all of whom the writer is indebted for valuable assistance.

The writer has also traveled over all the railroads traversing South Jersey, and car-window data and general note-book records of conspicuous species have been used as supplementary evidence in estimating abundance in the general statements accompanying each species.

The entire series of South Jersey plants in the Academy herbarium was gone over critically by the writer in 1908, and subsequently much of this material has been reviewed by Mr. Bayard Long and many difficult groups have been worked over by one or both of the above. Other questions of the identity of various South Jersey species have been investigated by members of the Philadelphia Botanical Club, whose work has been of the greatest benefit to the writer. In this connection, too, he must express his indebtedness to a number of botanists who have directly or indirectly aided his work by identifying material sent to them or by examining specimens in their institutions—Prof. M. L. Fernald, Dr. B. L. Robinson, Dr. N. L. Britton, Dr. J. K. Small, Mr. Norman Taylor, Mr. A. S. Hitchcock, Mrs. Agnes Chase, Mr. K. K. Mackenzie.

The statements on the time of flowering and fruiting of each species have been drawn up almost entirely by Mr. Bayard Long from the Academy Herbarium, his own and that of the writer. The results form an exceedingly valuable contribution to a subject that is too often treated loosely and accompanied by little or no original research. Mr. Long has prepared some account of the methods employed and the objects sought in this investigation, which will be found on p. 115.

As explained beyond (p. 70), ecologic problems have necessarily received scant attention, the aim of the work being to present facts of distribution from a geographic point of view for all plants of the region as a necessary preliminary to more comprehensive discussions of both geographic and ecologic distribution in the future.

While a local flora such as the present one is of the greatest assistance to the student, it is impossible to expect it to take the place of a Manual. Every botanist must have access to either *Britton's Manual*, the new *Gray's Manual* or one of the more

popular works of like character. The present work is to be regarded as supplementary to these, to show exactly what species are present in southern New Jersey and their distribution and relative abundance.

Popular or historical accounts of some of the more striking or noted species are added, however, and to meet the request of the Museum authorities, keys, which are in some cases unavoidably based on the same characters as those of the manuals, but in others largely original and supplementary to the latter have been prepared, and vernacular names given for each species.

So far as the resources of the library of the Academy of Natural Sciences of Philadelphia have permitted, the original place of publication has been looked up, the reference verified and the type locality stated. Where the latter is general or where several localities are mentioned no attempt has been made to sift the matter to the bottom, since this usually involves the selection or examination of a type specimen, as so admirably explained in Hitchcock's paper on the types of North American grasses and in the monograph of the genus *Panicum* by Hitchcock and Chase. About one hundred additional references to volumes not in Philadelphia were verified at the New York Botanical Garden with the courteous aid of Dr. J. H. Barnhart, and a few others at Cambridge by Prof. M. L. Fernald. Only one reference remains unverified (p. 527).

As to nomenclature the botanist in America, at least, is on the horns of a dilemma. He can follow either the Vienna Code* or the American Code.† Should he be also a zoölogist he will probably find it quite impossible to accept certain of the features of these codes which are at variance with the International Zoological Code (virtually identical with the A. O. U. Code).

The broad problems of Zoölogical and Botanical nomenclature are identical. The zoölogists have been "playing the game" seriously, longer than the botanists, and it seems logical to infer that, with the same tools to work with and the same object in view, men of the same intellectual ability will eventually adopt

* Cf. Rhodora, March, 1907, pp. 29-55.

† Cf. Bull. Torr. Bot. Club, April, 1907, pp. 167-178.

the same methods. In a great many particulars the recent botanical codes are already in accord with those framed by zoölogists.

The principal points in which they differ are as follows:

I. The Vienna Code believes in a list of generic "Nomina Conservenda" which shall be excluded from the operations of the law of priority. Such reservation is not allowed by the American or the Zoölogical Codes, and is contrary to the basic principle of our rules governing nomenclature.

II. The Vienna Code does not recognize the principle of types which constitutes the only possible basis for a stable nomenclature.

III. The Vienna Code places species and sub-species on different planes, so that a plant may bear one name if it is recognized as a species and another if it is called a sub-species. This plan was long ago rejected by zoölogists and was not adopted by the original American Botanical Code, although the later one has followed the Vienna Code in this respect, a distinctly retrograde step, in the opinion of the writer.

In the present report no attempt has been made to revise the nomenclature. The names given in Britton's Manual have been adopted except where changes have been suggested in subsequent publications. In such instances an investigation has been made into the merits of the proposed change and a decision reached in accordance with the American Botanical Code, except in the treatment of species and sub-species in separate categories, a most pernicious rule which botanists will in all probability ultimately reject. The original spelling of each name has also been followed except in the case of obvious typographical errors, and all specific names have been written with a lower case initial letter, according to the custom prevalent among zoölogists, while only one authority, the authority of the specific or subspecific name has been given.

In the matter of genera considerable diversity of opinion exists as to how many it is desirable to admit, but no departure has here been made from those recognized in Britton's Manual. The question is wholly one of individual opinion and involves the problem of just what use we propose to make of technical nomenclature. The more sub-genera we raise to generic rank the less meaning

do the names convey to the general botanist, as the mind's capacity for retaining names is limited. On the other hand, if we wish to recognize every group which shows any slight difference of structure by a distinct generic name, we are building our nomenclature on a purely evolutionary basis; we are emphasizing differences rather than resemblances between groups, and the generic name becomes less and less a clue to the systematic position of the plants which it comprises. Phylogenetic relationships can be expressed just as well by sub-generic headings in manuals, etc., and it is a serious question whether the objects of a generic name are not better attained if it is used in as broad a sense as possible.

The synonymy given under each species consists of the citation of the original place of publication, with the type locality in all cases where the reference has been personally verified, and all published references to the plant in southern New Jersey, mainly in Pursh's *Flora*, Michaux's *Flora*, Nuttall's *Genera*, Barton's *Flora* and the catalogues of Knieskern, Willis, Britton, and Keller & Brown. In the last, as well as in the works of Barton and Willis, many general statements occur which are evidently intended to cover southern New Jersey, but unless this region is especially mentioned these references are not cited, since the statements are based largely upon conditions farther north or on the Pennsylvania side of the Delaware, and do not apply at all to the region under consideration. Not a few of Dr. Britton's general statements, too, while doubtless true for the northern part of the State, are quite erroneous for our region.

The illustrations are, all of them, made especially for this work. The full-page plates are from beautiful water-color paintings by Mr. Hugh E. Stone, which unfortunately lose much of their force in half-tone reproduction. Mr. Stone also prepared the line drawings. The smaller figures and views are from photographs taken by Messrs. Stewardson Brown, T. M. Lightfoot and Bayard Long, while the cones, grasses and sedges were photographed from specimens under the author's supervision.

To all those mentioned in the above pages, especially to Mr. Bayard Long, the writer wishes to express his obligations, as

well as to Mr. Silas R. Morse, Curator of the New Jersey State Museum, for his assistance and encouragement.

Owing to the extremely short time available for the final preparation of the manuscript and the rapidity with which it was put through the press, many minor errors and inconsistencies have, no doubt, crept in, which would have been avoided had there been more time for revision. Many additional records have also come to light too late to be included, but a work of this kind is never complete, and if it paves the way for more thorough work along similar lines, its purpose will have been accomplished.

WITMER STONE.

September 1, 1911.

INTRODUCTION.

The object of this report is to present a complete list of the native plants known to grow in the coastal plain region of New Jersey, or, more exactly, in that part of the State lying south of the northern boundaries of Burlington and Monmouth counties, together with an outline of their distribution within this area and some account of the characteristics, habitat and history of the more important species.

The demand for such a report is threefold:

(1.) It supplies to teachers and students a local botany, to be used in conjunction with the general botanical manual, which must be in the hands of all; showing them exactly which of the plants described in the more general work are to be found in southern New Jersey, and in what sections they should be looked for.

(2.) It presents to botanists of New Jersey and elsewhere a study in geographical distribution, which may be used in connection with similar reports from other parts of the country in solving the more general problems of the distribution of life.

(3.) It places on permanent record the present condition and history of one of the most interesting botanical areas in the United States; which is still one of the most extensive areas in the Middle States left in primeval condition, but which is rapidly undergoing the inevitable changes incident to deforestation, cultivation and settlement—the Pine Barrens of New Jersey.

LIFE ZONES AND FLORAL BELTS OF EASTERN NORTH AMERICA.*

It was the original intention to consider in this report only the flora of the Pine Barrens, but it soon became evident that a

* Cf. C. Hart Merriam, *Geographic Distribution of Life in North America*, *Proc. Biol. Soc. Wash.*, VII, 1-64, 1892. *Laws of Temperature Control of the Geographic Distribution of Terrestrial Animals and Plants*, *Nat. Geog. Mag.*, 1894, 229-238. *Geographic Distribution of Animals and Plants in North America*, *Year Book U. S. Dept. Agr.* 1894, 203-214.

J. A. Allen, *Geographic Distribution of North American Mammals*, *Bull. Amer. Mus. Nat. Hist.*, XIV, 199-244, 1892.

proper understanding of its nature involved a thorough knowledge of the plants of the contiguous areas which, together with it, constitute the coastal plain section of the state. Furthermore, as it is necessary in a detailed study of distribution to have some definite boundary line, the limit above mentioned was selected. While this does not exactly coincide with the upper edge of the coastal plain, it comes quite close to it and does not include any of the higher ground above the fall line.

The coastal plain extends north of Burlington and Monmouth Counties to a line connecting Trenton and Bound Brook, thence to Passaic and Hackensack behind the Palisades, and includes all the low country adjacent to the Hackensack marshes as well as Staten Island, part of Long Island and the immediate coast district of southern New England. In New Jersey this involves parts of Mercer, Middlesex, Union, Hudson, Essex, Passaic and Bergen Counties, and, while the ranges of many southern New Jersey plants touch them all, the higher parts of these counties harbor so many northern plants that to include them would be confusing. Moreover, no southern plants occur in this northern extension of the coastal plain which do not also occur south of our boundary line.

This coastal plain region of New Jersey has always attracted the attention of naturalists because of the striking differences that are presented by its flora and fauna as compared with those of the higher ground of the Piedmont country to the north and west of it. Pennsylvanians often liken it to a bit of the Southern States that has been transported northward. Its climate in winter is certainly milder; there is rarely a heavy snowfall, and what does fall soon disappears, while many southern species of plants and insects and a few birds and mammals are found there which are unknown to the west of Philadelphia or elsewhere beyond the fall line.

It may seem incongruous to find a "southern flora and fauna" by going eastward, as we do in the vicinity of Philadelphia, but this is easily explained when we examine a map of the life zones of North America. As Dr. Merriam has shown, temperature is one of the chief—if not *the* chief—factors in fixing the boundaries of these zones. If the surface of the earth were level, they

would encircle the globe like the parallels of latitude—the tropical zone at the equator, followed by the austral, transition, boreal and arctic as we pass toward the north pole. The intervention of a mountain chain, like the Alleghanies, however, running in a general way at right angles to the life zones, materially alters their direction. The higher elevations carry the boreal zone far southward, while the other zones, covering successively lower altitudes, naturally run parallel to the general direction of the mountains. We therefore find (1) that the Boreal zone of Canada and upper Maine is in evidence on the higher mountain tops all the way to western North Carolina, the elevation necessary to support it becoming higher and higher as we go southward; (2) the Transition (Alleghanian) zone of our northern tier of States, which covers most of New England and New York, spreads southward over all of central Pennsylvania and northern New Jersey, and follows the mountains on both slopes to North Carolina, northern Georgia and eastern Tennessee; (3) the Upper Austral (Carolinian) zone, covering Illinois, Indiana and Ohio, sweeps southward, rounding the lower extremity of the Alleghanies, and then, bending northward again, flanks the Transition all the way to southeastern Pennsylvania and southern New Jersey, sending up terminal arms into the valleys of the Susquehanna, Delaware, Hudson and Connecticut rivers, covering Staten Island and western Long Island, and leaving its trace on the southern coast of New England. Below the Carolinian lies the Lower Austral zone (Austro-riparian), which covers the region between the seashore and a line drawn from the mouth of the Potomac to middle Georgia; thence it bends northward to the juncture of the Ohio and Mississippi, and thence southwest. The Cape Charles peninsula belongs to this zone, and a slight tinge is seen in the plant and bird life of southern Delaware and possibly of extreme southwestern New Jersey.

Consequently, with the life zones running northeast and southwest, we experience the same sequence of animal and plant life in traveling from the higher Alleghanies of Pennsylvania to the seacoast of southern New Jersey as we do in coming from Maine southward at sea level.

RELATIONSHIP BETWEEN THE FLORA OF THE COASTAL PLAIN AND
THAT OF THE PIEDMONT REGION.

The line separating the coastal plain from the Piedmont region to the west of it is known as the fall line and is marked throughout its extent by a more or less abrupt change of level. As already stated there is an appreciable difference in climatic conditions as we pass east or west of this line, and a more striking difference in soil conditions, the coastal plain being for the most part covered with sand and gravel in marked contrast to the heavier soils of the Piedmont. There are also frequent rock outcrops and rapid tumbling streams in the latter region, which are entirely lacking in the flat stretches of southern New Jersey. Historically, too, there are ample reasons for differences between the two regions, as the vastly older land of the Piedmont area was undoubtedly covered with vegetation before the coastal plain was elevated above the sea.

Hence it is not surprising that we should find a decided difference in the plant life of these two areas.

In the life-zone maps issued by the United States Department of Agriculture, and based mainly upon the distribution of birds and mammals, we shall notice that the line of demarcation between the Transition and Carolinian Zones is much further back towards the mountains than the line separating the coastal plain flora from that of the uplands. It is, however, well known that Carolinian birds and mammals are everywhere taking advantage of deforestation and cultivation to push northward, so that it is quite conceivable that the two lines may have been much more nearly identical in Pennsylvania and New Jersey under primeval conditions.

Whether the fall line ever did form the boundary between the faunal zones, there is no question but that it still marks a great change in plant life.

Farther south, however, it seems that a great many coastal plain plants range far west of the fall line, so that its effect upon distribution is less potent southward or else it coincides in the north more nearly with a line of demarcation in plant life due to other influences.

In plant distribution we have to reckon with other factors in addition to temperature, which are only indirectly instrumental in the distribution of vertebrate animals or are not at all in evidence.

(1) Soil conditions play a very important part in the distribution of plants, and (2) the past geological changes in the region, which necessarily caused great alterations in the ranges of both animals and plants, have often left their mark in the isolated colonies of plants still found in spots far removed from the present general habitat of the species, while in the case of free moving animals such cases are rare.

It should also be borne in mind that the life-zones of to-day are not permanently fixed, but are constantly and gradually changing, and oftentimes man accelerates these changes very materially by clearing forests, draining swamps, etc.*

The flowering and filicoid plants of the New Jersey coastal plain comprise 1373† species. Of this number no less than 807 are more or less common in the Piedmont region. They are either of boreal affinities or plants adapted to richer, heavier soil, and have spread southeastward across the fall line into the northern and western portions of the New Jersey coastal plain, where many of them are still rare or only locally common, some of them being restricted to the immediate vicinity of the Delaware River. Only 181 of them reach the Pine Barrens, and of these only 80 are at all abundant, these being species of wide range.

On the other hand, 91 species of austral affinities, which are widely distributed over the coastal plain, occur also more or less abundantly in the Piedmont region northwest of the fall line, though they vary greatly both in abundance and in the extent of their distribution westward.

The remaining 475 species are restricted to the coastal plain except for sporadic occurrences here and there in the Piedmont

* Cf. Trotter, Geological and Geographical Relations of the Land Bird, Fauna of Northeastern America. *The Auk*, 1909, p. 231-233 (especially p. 230).

† The figures given here and beyond vary slightly from the actual number of species in the list, as a few have been added and a few relegated to foot-notes or excluded entirely since this count was made.

region, where certain boggy spots seem to furnish the necessary conditions for the support of isolated colonies of coastal plain species. Quite a number of these lowland plants range right up to the fall line, occurring more or less plentifully in Pennsylvania on the strip of land lying between the Delaware River and the fall line, especially in Tinicum township, Delaware County, and about Bristol and Tullytown, in Bucks County. Among them may be mentioned:

<i>Lycopodium chapmanii</i> .	<i>Strophostylus helvolus</i> .
“ <i>alopecuroides</i> .	<i>Polygala cruciata</i> .
<i>Woodwardia virginica</i> .	<i>Crotonopsis linearis</i> .
“ <i>areolata</i> .	<i>Euphorbia ipecacuanhæ</i> .
<i>Chamaecyparis thyoides</i> .	<i>Ilex glabra</i> .
<i>Erianthus saccharoides</i> .	<i>Hibiscus moscheutos</i> .
<i>Andropogon corymbosus abbreviatus</i> .	<i>Ascyrum stans</i> .
<i>Panicum verrucosum</i> .	“ <i>hypericoides</i> .
“ <i>scoparium</i> .	<i>Hypericum adpressum</i> .
<i>Calamagrostis cinnoides</i> .	“ <i>virgatum ovalifolium</i> .
<i>Eragrostis pectinacea</i> .	“ <i>gymnanthum</i> .
<i>Uniola laxa</i> .	<i>Viola brittoniana</i> .
<i>Cyperus lancastriensis</i> .	“ <i>rafinesquii</i> .
<i>Eriophorum virginicum</i> .	<i>Ludwigia spærocarpon</i> .
<i>Eleocharis tricostrata</i> .	<i>Oenothera laciniata</i> .
<i>Rynchospora cymosa</i> .	<i>Kneiffia longipedicellata</i> .
<i>Scleria reticularis torreyana</i> .	<i>Oxypolis rigidior</i> .
<i>Carex folliculata</i> .	<i>Clethra alnifolia</i> .
“ <i>barrattii</i> .	<i>Leucothoe racemosa</i> .
“ <i>caroliniana</i> .	<i>Pieris mariana</i> .
“ <i>leptalea harperi</i> .	<i>Arctostaphylos uva-ursi</i> .
<i>Xyris torta</i> .	<i>Sabatia gracilis</i> .
<i>Juncus dichotomus</i> .	<i>Limnanthemum lacunosum</i> .
“ <i>scirpoides</i> .	<i>Asclepias rubra</i> .
<i>Lilium superbum</i> .	<i>Monarda punctata</i> .
<i>Smilax tamnifolia</i> .	<i>Linaria canadensis</i> .
<i>Iris prismatica</i> .	<i>Gratiola aurea</i> .
<i>Pogonia ophioglossoides</i> .	<i>Gerardia purpurea</i> .
<i>Betula populifolia</i> .	<i>Utricularia inflata</i> .
<i>Quercus phellos</i> .	<i>Lobelia nuttallii</i> .
“ <i>triloba</i> .	<i>Eupatorium verbenæfolium</i> .
<i>Magnolia virginiana</i> .	“ <i>pubescens</i> .
<i>Drosera longifolia</i> .	<i>Solidago neglecta</i> .
“ <i>rotundifolia</i> .	<i>Euthamia caroliniana</i> .
<i>Liquidambar styraciflua</i> .	<i>Aster novi-belgii</i> .
<i>Spiræa tomentosa</i> .	<i>Bidens trichosperma</i> .
<i>Rubus cuneifolius</i> .	<i>Senecio crowfordii</i> .
<i>Meibomia laevigata</i> .	<i>Carduus spinosissimus</i> .

Certain coastal plain species occur a short distance above the fall line along river valleys, and while this is not particularly noticeable on the smaller streams flowing into the Delaware from eastern Pennsylvania, it is obvious along the Delaware River itself for some distance north of Trenton, where Dr. Britton has recorded a number of coastal plain species in his *Catalogue of New Jersey Plants*.

In the valley of the lower Susquehanna also a number of species occur within the limits of Pennsylvania, which do not range so far northward elsewhere except in the New Jersey coastal plain. Their distribution is, of course, more or less continuous down the shores of Chesapeake Bay to the coastal plain in Maryland; while they are absent in the intervening Piedmont region of southern Pennsylvania.

Such species are:

<i>Pinus echinata.</i>	<i>Ptelea trifoliata.</i>
<i>Cyperus lancastriensis.</i>	<i>Chionanthus virginianus.</i>
<i>Blephariglottis peramœna.</i>	<i>Asimina triloba.</i>
<i>Castanea pumila.</i>	<i>Dianthera americana.</i>
<i>Cercis canadensis.</i>	<i>Lippia lanceolata.</i>
<i>Meibomia sessilifolia.</i>	<i>Ipomœa lacunosa.</i>
<i>Phaseolus helvolus.</i>	<i>Ruellia ciliosa.</i>
<i>Opuntia opuntia.</i>	<i>Galium concinnum.</i>
<i>Ilex opaca.</i>	<i>Boltonia asteroides.</i>
<i>Rhus vernix.</i>	<i>Willughbæya scandens.</i>
<i>Euonymus atropurpureus.</i>	<i>Tecoma radicans.*</i>
<i>Acer negundo.</i>	

Some of these, notably *Cercis*, occur on the upper Delaware and Raritan, quite isolated from the general range of the species to the southward, but they are everywhere plants of the hilly country near the fall line and not coastal plain species.

The isolated colonies of coastal plain plants in the Piedmont region, already referred to, are probably not as numerous as formerly, owing to the general tendency to drain the bogs and

* Other species occur in the lower Susquehanna Valley which are not known from New Jersey and are hence omitted from this list. Many of those listed are much more common in the Susquehanna Valley than in that of the Delaware, as one would expect in passing nearer to the upper limits of the coastal plain, and on the Raritan or lower Hudson all but one or two have disappeared. A few species in the list extend casually to southern New England along the coast, and a few occur in isolated colonies in other parts of southeastern Pennsylvania.

swamps which are necessary for their existence. Some, however, still survive, and we have fortunately pretty good lists of species from others which have been destroyed. Probably the most remarkable spot of this sort is Frazer's bog, near Willow Grove, Montgomery County.

Here we find quite a plantation of swamp magnolias, with which grow a large number of coastal plain plants. From the boyhood of the oldest residents and still earlier, according to the reports handed down by their fathers, this bog has presented much the same condition as at present, but more recently strenuous efforts have been made, with but little success, to fill it in and convert it into a meadow. The flora of this bog was apparently first collected by Mr. C. F. Saunders, later Mr. Alex. MacElwee published some notes upon it,* and Mr. S. S. Van Pelt and Bayard Long made collections. From these sources as well as from my own herbarium the following list is compiled:

<i>Panicum lucidum.</i>	<i>Limodorum tuberosum.</i>
“ <i>meridionale.</i>	<i>Magnolia virginiana.</i>
<i>Calamagrostis cinnoides.</i>	<i>Drosera rotundifolia.</i>
<i>Agrostis elata.</i>	<i>Rubus hispidus.</i>
<i>Eleocharis tuberculosa.</i>	<i>Polygala cruciata.</i>
<i>Eriophorum virginicum.</i>	<i>Rhus vernix.</i>
<i>Rynchospora glomerata.</i>	<i>Acer rubrum carolinianum.</i>
“ <i>alba.</i>	<i>Hypericum canadense.</i>
<i>Scleria reticularis torreyana.</i>	<i>Triadenum virginicum.</i>
<i>Carex varia emmonsii.</i>	<i>Linum striatum.</i>
“ <i>interior.</i>	<i>Oxypolis rigidior.</i>
“ <i>atlantica.</i>	<i>Gaylussaccia dumosa.</i>
<i>Xyris torta.</i>	<i>Gentiana saponaria.</i>
<i>Juncus scirpoides.</i>	<i>Asclepias rubra.</i>
<i>Lilium superbum.</i>	<i>Gerardia purpurea.</i>
<i>Aletris farinosa.</i>	<i>Eupatorium verbenæfolium.</i>
<i>Blephariglottis cristata.</i>	<i>Aster novi-belgii.</i>
<i>Pogonia ophioglossoides.</i>	

The Smithville swamp, in Lancaster County, is a somewhat similar locality, from which Prof. Porter has recorded the following:

* Proc. Acad. Nat. Sci. Phila., 1901, pp. 485-486.

<i>Calamagrostis cinnoides.</i>	<i>Arethusa bulbosa.</i>
<i>Andropogon corymbosus abbreviatus.</i>	<i>Blephariglottis ciliaris.</i>
<i>Scleria triglomerata.</i>	<i>Quercus marylandica.</i>
<i>Carex oblita.</i>	<i>Magnolia virginiana.</i>
“ <i>vestita.</i>	<i>Linum striatum.</i>
“ <i>polymorpha.</i>	<i>Rhus vernix.</i>
“ <i>bullata.</i>	<i>Polygala nuttallii.</i>
<i>Orontium aquaticum.</i>	<i>Viburnum nudum.</i>
<i>Juncus debilis.</i>	<i>Gaylussacia dumosa.</i>
<i>Smilax glauca.</i>	<i>Leucothoe racemosa.</i>
<i>Aletris farinosa.</i>	<i>Kalmia angustifolia.</i>
<i>Cypripedium acaule.</i>	<i>Azalea viscosa.</i>
<i>Pogonia ophioglossoides.</i>	<i>Asclepias rubra.</i>

The further tabulation of the distribution of coastal plain plants in the Piedmont of Pennsylvania and northern New Jersey cannot be too highly recommended, as it is likely to throw light upon a problem of great importance.

GENERAL GEOGRAPHICAL DISTRIBUTION OF THE PLANTS COMPRISING THE FLORA OF THE NEW JERSEY COASTAL PLAIN.

A detailed study of the 1,373 species of flowering and filicoid plants which occur in the New Jersey coastal plain shows that they are divisible into four categories.*

(1) Species of wide range north and south through eastern North America and sometimes much farther—742 species.

(2) Species of northern affinities which reach the southern limit of their range on the Atlantic coast in or near southern New Jersey—121 species.

(3) Species of southern affinities which range north only as far as New Jersey or to the narrow extension of the coastal plain

* In making up these lists and those which follow, a series of card slips was prepared, representing all the species found in the region under consideration. On each slip was recorded the several districts of southern New Jersey (see beyond) in which the species occurs and the northern and southern limit of its distribution in eastern North America, the latter being compiled from Britton's Manual, the new Gray's Manual, and a few recent monographs. The cards were then sorted and re-sorted into the various categories and the desired lists and figures readily obtained.

As this report goes to press, a notable paper by Prof. M. L. Fernald appears in *Rhodora* (1911, pp. 109-162), on the Origin of the Newfoundland Flora, in which he adopts nearly the same method of contrasting the several elements

which is found on Long Island, N. Y., southern Connecticut and Rhode Island and eastern Massachusetts—479 species.†

(4) Species of local distribution, restricted to New Jersey and portions of the immediately adjacent States lying within the coastal plain—31 species.

PLANTS OF WIDE RANGE.—These species may be divided into three groups, as follows:

Ranging throughout North America, ...	22
Newfoundland—New Brunswick on the north to Virginia—Florida on the south, ...	420
Maine—Vermont to Virginia—Florida, ...	300

As already said, many of these plants barely enter our region on the northwest, so that the lower part of New Jersey is really on the southern boundary of their range, although since they follow the trend of the mountains to the southwest the actual southern limit of their range, given in the Manuals, is far down in the southern States. The most surprising fact in the study of these ranges is the large number of plants which range from the far north all the way to Florida and yet are rare or absent in the lower part of the New Jersey coastal plain, but the brief data of the Manuals is hardly sufficient for detailed studies of distribution and many of them may be quite as scarce in Florida as they are in southern New Jersey.

THE NORTHERN ELEMENT.—A second group of our New Jersey coastal plain plants includes those which find the absolute southern limit of their range in this region or close to it, while they extend north to Maine or the Canadian provinces. They may be divided as follows:

Canadian Provinces to New Jersey, ...	60
Maine to New Jersey, ...	18
Vermont or New Hampshire to New Jersey, ...	3
Canadian Provinces to Delaware or Maryland, ...	27
Maine to Delaware or Maryland, ...	13

121

as I have employed in the following pages. He likewise considers *all* the species native to the region, which, as I have stated elsewhere, is the only way to logically discuss the floral relationship of a district.

† Cf. Collins, *Flora of Lower Cape Cod*, *Rhodora* XI, 125; XII, 8; XIII, 17. and Sears, *Essex Co. Mass. Rhodora* X, p. 42.

The detailed lists of species are as follows:

CANADIAN PROVINCES TO NEW JERSEY.*

<i>Isoetes echinosp. braunii</i> M.	<i>Salix bebbiana</i> M.
<i>Lycopodium inundatum</i> M.	“ <i>lucida</i> C.
<i>Schizæa pusilla</i> PB.	<i>Dondia maritima</i> C.
<i>Potamogeton oakesianus</i> PB, CM.	<i>Chenopodium rubrum</i> C.
<i>Scheuchzeria palustris</i> M.	<i>Moehringia lateriflora</i> M, C.
<i>Triglochin maritima</i> C.	<i>Actæa rubra</i> M.
<i>Savastana odorata</i> C.	<i>Oxygraphis cymbalaria</i> C.
<i>Spartina michauxiana</i> C.	<i>Nymphæa variegata</i> PB.
<i>Phalaris arundinacea</i> M.	<i>Rosa virginiana</i> C.
<i>Panicularia canadensis</i> M.	<i>Dalibarda repens</i> M.
“ <i>obtusata</i> M, PB, CM.	<i>Geum strictum</i> M.
“ <i>grandis</i> M.	<i>Lathyrus maritimus</i> C.
<i>Scirpus subterminalis</i> PB, CM.	<i>Corema conradii</i> PB.
“ <i>robustus paludosus</i> C.	<i>Geranium robertianum</i> C.
<i>Eriophorum tenellum</i> M, PB, CM.	<i>Hypericum boreale</i> C, CM.
“ <i>gracile</i> M.	“ <i>ellipticum</i> M.
<i>Carex lanuginosa</i> M, C.	“ <i>ascyron</i> M.
“ <i>trichocarpa</i> M.	<i>Polanisia graveolens</i> M.
“ <i>exilis</i> PB.	<i>Arctostaphylos uva-ursi</i> PB.
“ <i>livida</i> PB.	<i>Vaccinium pennsylvanicum</i> M.
“ <i>canescens disjuncta</i> M, PB.	<i>Myriophyllum tenellum</i> M, C.
“ <i>utriculata</i> M.	<i>Glaux maritima</i> C.
“ <i>limosa</i> M.	<i>Limosella tenuifolia</i> M, C.
“ <i>silicea</i> C.	<i>Menyanthes trifoliata</i> M, CM.
<i>Eriocaulon septangulare</i> PB.	<i>Utricularia intermedia</i> PB.
<i>Juncus articulatus</i> C.	<i>Plantago decipiens</i> C.
“ <i>pelocarpus</i> M, PB, CM.	<i>Aster nemoralis</i> PB.
<i>Sisyrinchium angustifolium</i> C.	<i>Solidago uniligulata</i> PB.
<i>Populus tremuloides</i> M, C.	<i>Xanthium commune</i> M.
“ <i>grandidentata</i> M.	

MAINE TO NEW JERSEY.†

<i>Isoetes canadensis</i> M.	<i>Carex annectens</i> M, PB.
<i>Potamogeton confervoides</i> PB, C.	“ <i>umbellata tonsa</i> M, PB.
<i>Muhlenbergia foliosa</i> M.	“ “ <i>abditata</i> M.
<i>Panicularia laxa</i> M.	“ <i>festucea brevior</i> CM.
<i>Sporobolus serotinus</i> PB.	<i>Juncus greenii</i> M.
<i>Elymus striatus</i> M, C.	<i>Chenopodium leptophyllum</i> C.
<i>Scirpus smithii</i> M.	<i>Polygonum careyi</i> M, C.
“ “ <i>setosus</i> M.	“ <i>atlanticum</i> C.
“ <i>torreyi</i> [Vt.] M.	<i>Hypericum majus</i> M.
<i>Carex interior capillacea</i> [N. H.]	<i>Plantago major</i> M, C.
M, PB.	<i>Eupatorium sessilifolium</i> [Vt.] M.

* The letters following the names indicate the several divisions of the New Jersey coastal plain in which they occur. See p. 57.

† Those ranging only to Vt. or N. H. are so marked.

CANADIAN PROVINCES TO DELAWARE OR MARYLAND.

<i>Botrychium neglectum</i> M.	<i>Alsine uliginosa</i> M.
<i>Puccinellia fasciculata</i> C.	<i>Anemone canadensis</i> M.
<i>Rhynchospora fusca</i> PB, CM.	<i>Potentilla argentea</i> M, C.
<i>Carex umbellata</i> M, PB, CM.	<i>Drymocallis arguta</i> M.
“ <i>folliculata</i> M, PB, CM.	<i>Vitis vulpina</i> M.
“ <i>trisperma</i> PB.	<i>Callitriche heterophylla</i> M.
“ <i>hormathodes</i> C, CM.	<i>Cicuta bulbifera</i> M.
<i>Juncus militaris</i> PB, CM.	<i>Angelica atropurpurea</i> M.
<i>Leptorchis læselii</i> M, CM, C.	<i>Pyrola chlorantha</i> M.
<i>Salix discolor</i> M.	“ <i>elliptica</i> M.
“ <i>interior</i> M.	“ <i>secunda</i> M.
<i>Betula populifolia</i> PB.	<i>Utricularia clandestina</i> PB.
<i>Sagina procumbens</i> C.	<i>Aster radula</i> M.
<i>Alsine longifolia</i> M.	

MAINE TO DELAWARE OR MARYLAND.

<i>Isoetes engelmanni</i> [N. H.] M.	<i>Potentilla pumila</i> M, C.
<i>Dryopteris simulata</i> M, PB.	<i>Myriophyllum humile</i> M, C, PB.
<i>Panicum scribnerianum</i> M.	<i>Antennaria fallax</i> M.
<i>Agrostis maritima</i> C.	“ <i>parlinii</i> M, CM, C.
<i>Panicularia acutiflora</i> M.	<i>Bidens connata</i> M, C.
<i>Carex vestita</i> M, CM.	<i>Carduus odoratus</i> M.
“ <i>lupuliformis</i> [Vt.] M.	

THE SOUTHERN ELEMENT.—The third group of New Jersey coastal plain plants comprises those which find their northern limit of distribution in or near this region. They may be grouped as follows:

Ranging north to.....	N. J.	So. N. Y.*	R. I. or Ct.	Mass.†
From Va., ...	4	1	3	14
N. C., ...	6	7	4	12
S. C., ...	6	2	4	3
Ga., ...	15	9	12	24
Fla., ...	133	58	46	116
	164	77	69	169

The detailed lists of species follow:

* Staten Island and Long Island for the most part.

† Usually the immediate coast district or outlying islands.

NEW JERSEY TO FLORIDA.*

- Lycopodium carolinianum* PB.
Pinus taeda CM.
 " *serotina* M, CM.
Taxodium distychum CM.
Cœlorachis rugosa CM.
Erianthus divaricatus [Ga.] PB.
 " *saccharoides* M, C, CM.
Andropogon elliotii M, CM.
Paspalum membranaceum M, CM.
 " *laeve australe* C, CM.
 " " *angustifolium* M, C,
 CM.
 " *glabratum* C, CM.
 " *plenipilum* C, CM.
Panicum hemitomon CM.
 " *condensum* C, CM.
 " *anceps* M, CM.
 " *angustifolium* CM.
 " *aciculare* CM.
 " *cærulescens* CM.
 " *ensifolium* [Ga.], PB, CM.
 " *leucothrix* PB.
 " *wrightianum* CM.
 " *oligosanthes* M, PB, CM.
 " *scabriusculum* PB.
 " *cryptanthum* PB.
 " *polyanthes* [Ga.], M, CM.
 " *lanuginosum* C, CM.
Amphicarpon amphicarpon PB, CM.
Sacciolepis striata CM.
Chaetochloa magna C, CM.
Cenchrus tribuloides C.
Aristida oligantha M.
 " *lanosa* M, CM.
Agrostis elata [Ga.], PB, CM.
Calamovilfa brevipilis [N. C.] PB.
Danthonia epilis PB.
Gymnopogon ambiguus M, CM.
 " *brevifolius* M, CM.
Poa brachyphylla [S. C.], M, CM.
Cyperus hystericinus [Ga.] M.
 " *retrofractus* M.
 " *microdontus* CM, C.
 " *lancastriensis* [Ga.] M.
 " *pseudovegetus* M.
Eleocharis tortilis M, CM.
 " *ocreata* CM.
Rhynchospora smallii M, PB.
 " *rariflora* CM.
 " *glomerata leptocarpa* PB.
 " *filifolia* PB.
 " *pallida* [N. C.], PB, CM.
 " *oligantha* PB.
 " *knieskernii* [Va.] PB.
 " *axillaris microcephala*
 PB.
 " *cymosa* M, CM.
Fuirena hispida C.
Fimbristylis autumnalis M, PB, C, CM.
Scleria pauciflora M, CM.
Carex leptalea harperi M, CM.
Xyris fimbriata PB.
 " *elata* CM.
 " *arenicola* PB.
Eriocaulon decangulare PB, CM.
 " *compressum* PB, CM.
Commelina communis MC.
Juncus setaceus CM.
Xerophyllum asphodeloides PB.
Tofieldia racemosa PB.
Uvularia nitida [S. C.] PB.
Smilax tamnifolia [S. C.] PB, CM.
 " *laurifolia* PB, CM.
 " *walteri* PB, CM.
Lophiola americana PB.
Gymnadeniopsis integra PB.
 " *nivea* CM.
Blephariglottis cristata PB, CM.
 " *peramoena* [Ga.] M,
 CM.
Pogonia divaricata PB, CM.
Gyrostachys præcox PB, CM.
Listera australis M, PB.
Tipularia discolor M, CM.
Corallorhiza wisteriana M.
Myrica cerifera CM, C.
Castanea pumila M.
Quercus triloba M, C, CM.
 " *michauxii* M.
Polygonum setaceum CM.

* Species ranging only to Va., N. C., S. C., or Ga. are so marked.

- Polygonum eciliatum* CM.
Phoradendron flavescens M, PB.
Asimina triloba M.
Itea virginica PB, CM.
Malus angustifolia CM.
Prunus angustifolia M.
Cercis canadensis M.
Æschynomene virginica M.
Meibomia stricta M, PB.
Lespedeza stuvei neglecta [Ga.] CM.
 " *oblongifolia* PB.
Bradburya virginiana M, C.
Polygala incarnata M.
 " *mariana* PB, CM.
Rhus toxicodendron [Ga.] M, C.
Vitis cordifolia M, C.
Hypericum densiflorum PB.
 " *gymnanthum* [Ga.] M.
Viola emarginata [Va.] M, C, CM.
Rhexia aristosa [Ga.] PB.
Lythrum lineare C.
Ludwigiantha arcuata C.
Ludvigia linearis PB.
 " *hirtella* PB, CM.
Oenothera humifusa C.
 " *laciniata* MC.
Eryngium aquaticum PB.
Thaspium trifoliatum [Ga.] N, M.
Oxypolis rigidior longifolius [S. C.]
 PB
Dendrium buxifolium PB.
Vaccinium virgatum PB.
Chionanthus virginica M.
Sabbatia lanceolata PB, CM.
Gentiana porphyrio PB, CM.
 " *villosa* M.
Obolaria virginica [Ga.] M.
- Limnanthemum aquaticum* M.
Asclepias rubra PB, CM.
 " *lanceolata* C.
Pyxidanthera barbulata [N. C.] PB.
Cuscuta cephalanthi PB.
Breweria pickeringii [N. C.] PB.
Lippia lanceolata C.
Koellia aristata C.
Gratiola pilosa M, CM.
 " *sphærocarpa* M, CM.
Micranthemum micranthemoides M.
Gerardia racemulosa PB.
Buchnera americana [Va.] M.
Melampyrum latifolium M.
Utricularia juncea PB, CM.
Tecoma radicans M, CM, C.
Ruellia ciliosa CM.
Diodia virginiana CM.
Galium hispidulum CM.
 " *pilosum punctulosum* PB, CM.
 " *concinnum* [Va.] M.
Viburnum scabrellum M.
Lobelia canbyi [S. C.] PB.
 " *puberula* M, C, CM.
Lactuca sagittifolia [S. C.] M.
Nabalus virgatus PB.
Eupatorium coelestinum M, CM.
Kuhnia eupatorioides [Ga.] M.
Lacinaria g. pilosa PB, C, CM.
Solidago stricta PB.
 " *fistulosa* PB, C, CM.
Aster gracilis [N. C.] PB, C, CM.
Doellingeria umbellata humilis PB.
Pluchea foetida CM.
Actinomeris alternifolia M.
Mesadenia reniformis [N. C.] M.
Senecio tomentosa C, CM.

NEW YORK TO FLORIDA.

- Pinus virginiana* [S. C.] M. PB. CM.
Andropogon littoralis C.
Paspalum laeve circulare C, CM.
 " *pubescens* [Ga.] M, C.
Panicum mattamusketense [N. C.] C.
 " *lucidum* PB, C, CM.
Uniola laxa M, C, CM.
- Cyperus ovularis* M, C, CM.
 " *flavescens* M, PB, C, CM.
 " *cylindricus* PB, C, CM.
Eleocharis tricostata PB, CM.
Rhynchospora axillaris PB.
Fimbristylis castanea C.
Psilocarya nitens CM.

- Carex oblita* [N. C.] M, CM.
 " *carolinensis* [N. C.] M.
Juncus scirpoides M, C, CM.
 " *dichotomus* M, PB, C, CM.
Zygadenus leimanthoides [Ga.] M. PB.
Helonias bullata [N. C.] M, PB, CM.
Melanthium virginicum [Ga.] M.
Chrosperma muscaetoxicum M.
Quercus marilandica PB, C, CM.
 " *phellos* M, C, CM.
Sesuvium maritima C.
Arenaria caroliniana PB.
Ranunculus pusillus M.
Nymphæa advena M.
Capnoides flavulum [Va.] M, CM.
Cardamine rotundifolia [N. C.] M.
Hydrangea arborescens M.
Porteranthus trifolius [Va.] M.
Aronia arbutifolia M, PB, C, CM.
Cratægus tomentosus M, PB.
Stylosanthes biflora M, PB, CM.
Meibomia lævigata M, CM.
 " *viridiflora* M.
Galactia regularis M, PB, CM.
 " *volubilis* CM.
Strophostyles umbellata M, C, CM.
Ptelea trifoliata M.
Polygala lutea PB, CM.
Euphorbia darlingtonii [N. C.] M.
Euonymus americanus M, C, CM.
 " *atropurpureus* M.
Kosteletzkya virginica, C, CM.
Ascyrum stans, PB, CM.
Lechea racemulosa PB, CM.
Viola hirsutula [Ga.] M.
 " *rafinesquii* [Ga.] M.
Rhexia mariana PB, CM.
Aralia spinosa M.
Chaerophyllum procumbens [N. C.] M.
Oxypolis rigidior M, C, CM.
Sabatia angularis M, C, CM.
Asclepias variegata M, C, CM.
Polemonium reptans [Ga.] M.
Phlox subulata M.
Mertensia virginica [S. C.] M.
Scutellaria pilosa M, CM.
Monarda punctata M, C, CM.
Cunila origanoides M, CM.
Gerardia holmiana PB.
Utricularia fibrosa PB.
 " *virgatula* PB, CM.
Oldenlandia uniflora M, C, CM.
Lobelia nuttallii [Ga.] PB, C, CM.
Lactuca villosa M.
 " *floridana* M, C.
Eupatorium album PB, C, CM.
 " *leucolepis* PB, C, CM.
Solidago erecta [Ga.] PB, CM.
Helianthus angustifolius PB, C, CM.
Chrysopsis mariana M, PB, CM.

RHODE ISLAND OR CONNECTICUT TO FLORIDA.

- Sagittaria longirostra* [Ga.] PB, CM.
 " *subulata* M.
Tripsacum dactyloides C.
Panicum longifolium PB, CM.
 " *stipitatum* [S. C.] M.
 " *meridionale* [Ga.] PB, C, CM.
 " *pseudopubescens* M, PB, CM.
 " *commonsianum* PB, C, CM.
 " *virgatum cubense* M, PB.
 " *amarum* [Ga.] C.
Chaetochloa imberbis M.
 " " *versicolor* C.
Spartina cynosuroides C.
Sporobolus clandestinus M, CM.
Sphenopholis obtusata C.
 " " *pubescens* CM,
 C.
Tridens flavus M, C.
Eleocharis quadrangulata [Ga.] CM.
 " *torreyana* PB.
Scirpus eriophorum M, PB, C, CM.
Scleria torreyana PB, CM.
Carex collinsii [Ga.] M, PB, CM.
 " *squarrosa* [Ga.] M.
 " *barratii* [N. C.] PB, CM.
 " *styloflexa* M, CM.
 " *nigromarginata* [N. C.] M.
Wolffia columbiana M.
Tradescantia virginica [S. C.] M.
Heteranthera reniformis M.
Juncus debilis [S. C.] M, PB, CM.
Dioscorea villosa M, C, CM.
Populus heterophylla [Ga.]
Chenopodium boscianum [N. C.].

Amaranthus pumilus [N. C].
Aristolochia serpentaria M, CM.
Heuchera americana [Ga.] M, CM.
Liquidambar styraciflua M, C, CM.
Rubus cuneifolius M, PB, C, CM.
Prunus americanus M.
Geum flavum [Va.] M.
Agrimonia rostellata [Va.] M.
 " *parviflora* [Ga.], M.
Lespedeza repens, M, PB, C, CM.
Phaseolus polystachyus M, C.
Polygala brevifolia PB.
Crotonopsis linearis M, PB.
Euphorbia ipecacuanhæ PB, CM.
Rhus vernix M, PB, C, CM.
Kneiffia longipedicellata.
Zizia cordata [Ga.] M.
Eryngium yuccaefolium C.
Pieris mariana M, PB, C.

Diospyros virginiana M, C.
Gentiana saponaria MC, CM.
Ipomoea pandurata M, CM.
Phlox maculata M, CM.
 " *pilosa* M.
Salvia lyrata M, C, CM.
Trichostema lineare [Ga.] PB.
Mimulus alatus [Ga.] M.
Plantago virginica M, C, CM.
Viburnum nudum M, PB, CM.
 " *prunifolium* [S. C.] M, CM.
Diodia teres M, PB, C, CM.
Eupatorium rotundifolium [Va.] M, C, CM.
Boltonia asteroides CM.
Helenium autumnale MC, CM.
Synosma suaveolens.
Bidens bipinnata M, C.

MASSACHUSETTS TO FLORIDA.

Lycopodium alopecuroides M, PB, CM.
Botrychium dissectum M, C, CM.
Helianthium tenellum M.
Andropogon corymbosus abbreviatus
 M, C, PB, CM.
 " *virginicus* M, C, PB, CM.
Panicum verrucosum M, PB, CM.
 " *columbianum thinium* PB,
 C, CM.
 " *addisonii* M, PB, C, CM.
 " *oricola* PB, C.
 " *villosissimum* M, PB, CM.
 " *ashei* M, PB, CM.
 " *clutei* PB, CM.
 " *barbulatum* M, CM.
 " *microcarpon* M, C, CM.
 " *scoparium* M, C, CM.
 " *commutatum* CM.
 " *boscii* M, CM.
Aristida purpurascens M, C, PB, CM.
 " *tuberculosa* M.
Muhlenbergia capillaris M.
 " *tenuiflora* M.
Stipa avenacea M, CM.
Danthonia sericea M, PB, C.
Sphenopholis pallens M, CM.
Spartina glabra pilosa C.

Diplachne fascicularis C.
Cyperus filiculmis M, CM.
 " *speciosus* M, C, PB, CM.
 " *erythrorhizos* M, C.
Eleocharis interstincta M.
 " *engelmanni* M.
 " *melanocarpa* M, CM.
 " *tuberculosa* PB, CM.
Scirpus robustus C.
Fuirena squarrosa C.
Rynclospora macrostachya M, CM.
 " *macr. inundata* M, PB.
Scleria triglomerata PB.
 " *verticillata* C, CM.
 " *reticularis* CM.
Carex triceps M, CM.
 " *glaucodea* M, CM.
 " *abscondita* M, CM.
 " *walteriana* PB, C, CM.
 " *willdenovii* N, M.
 " *hormathodes richii* M.
Lemna perpusilla C.
Orontium aquaticum PB, CM.
Xyris torta M, C, PB, CM.
 " *congdoni* M, PB, CM.
Juncus aristulatus PB, C, CM.
Gyrotheca tinctoria PB, CM.

- Chamæirium luteum* M.
Uvularia perfoliata M, CM.
Sisyrinchium mucronatum M.
Smilax glauca M, PB, C.
Isotria verticillata M.
Gyrostachys vernalis PB, C.
Juglans nigra M.
Hicoria alba M, CM.
Betula nigra M, C, CM.
Quercus palustris M, CM.
 " *stellata* M, C, PB, CM.
Rumex hastatulus C.
Polygonum maritimum C.
 " *punctatum* M, C, CM.
Atriplex arenaria C.
Anychia canadensis M.
Sagina decumbens M, C.
Silene caroliniana M, C.
 " *stellata* M, C.
Nelumbo lutea M.
Liriodendron tulipifera M, C, CM.
Magnolia virginiana M, PB, C, CM.
Draba caroliniana M.
Cardamine bulbosa M.
Arabis canadensis M.
Drosera filiformis PB, C.
Ribes rotundifolium M.
Cratægus pruinosa M.
Agrimonia mollis M, CM.
Cassia chamæcrista M, C, CM.
Lespedeza angustifolia PB, CM.
 " *stuvei* M, PB, CM.
Meibomia obtusa M, C, PB, CM.
 " *michauxii* M, PB, CM.
 " *marilandica* M, PB, CM.
 " *sessilifolia* PB.
 " *canescens* M, CM.
Strophostyles helvula M, C.
Geranium carolinianum M.
Oxalis violacea M.
Linum floridanum PB, C.
 " *striatum* M, PB, C, CM.
Polygala nuttallii PB, C, CM.
Euphorbia preslii M.
 " *corollata* M, C.
Ilex opaca M, C, CM.
 " *glabra* PB, C, CM.
Acer rub. carolinianum PB, C, CM.
Hibiscus moscheutos M, C, CM.
Ascyrum hypericoides M, PB, C, CM.
- Hypericum adpressum* M, CM.
Lechea leggettii M, PB, C, CM.
Viola sagittata M, C.
 " *palmata* M.
 " *papilionacea* M.
Opuntia opuntia M, C.
Rotala ramosior M, PB, CM.
Lythrum alatum M, C.
Kneiffia linearis M, PB, C, CM.
Ludvigia sphærocarpa M, PB, CM.
 " *alternifolia* M, C, PB, CM.
Myriophyllum pinnatum M, C, CM.
Hydrocotyle verticillata C, CM.
 " *umbellata* M, C, CM.
Ptilimnium capillaceum C.
Angelica villosa M, CM.
Chimaphila maculata M, C, CM.
Azalea nudiflora M, CM.
 " *viscosa glauca* PB, C.
Leucothoe racemosa M, PB, CM.
Polycodium stamineum M.
Sabatia dodecandra C, CM.
 " *stellaris* C.
 " *gracilis* M, C, CM.
Bartonia paniculata M, C, PB, CM.
Asclepias verticillata M, CM.
Acerates viridiflora M.
Cuscuta arvensis M, PB.
 " *compacta* M, PB.
Onosmodium virginianum M.
Verbena angustifolia M, PB, C.
Scutellaria integrifolia M, C, CM.
Agastache nepetoides M.
Stachys hyssopifolia M.
Stachys aspera M.
Lycopus sessilifolius M, C, PB, CM.
Leptandra virginica M.
Scrophularia marylandica M.
Pedicularis lanceolata M, CM.
Castilleja coccinea M.
Ilysanthes anagallidea M, C, CM.
Gerardia purpurea M, PB, C, CM.
Schwalbea americana PB.
Utricularia subulata PB, C, CM.
 " *cleistogama* PB, C, CM.
Plantago elongata M, CM.
Valerianella radiata M, CM.
Viburnum venosum M, C, CM.
Triosteum perfoliatum M, CM.
Adopogon virginicum M, C, CM.

56 REPORT OF NEW JERSEY STATE MUSEUM.

Hieracium gronovii M, c, PB, CM.	Euthamia caroliniana M, PB, c, CM.
Vernonia noveboracensis M, c, CM.	Aster tenuifolia c.
Lacinaria spicata M, c, CM.	" concolor M, PB, CM.
Eupatorium verbenæfolium M, PB, c,	Coreopsis rosea M, PB.
CM.	Bidens lævis M, c, CM.
" aromaticum M, CM.	" trichosperma M, c, CM.
" hyssopifolium M, PB, c,	Pluchea camphorata c.
CM.	Baccharis halimifolia c.
Solidago elliotii c, CM.	

LOCAL ELEMENT.—Finally we have a group of plants restricted to New Jersey or spreading only to the States immediately north and south of it, or west to Pennsylvania. Some of these undoubtedly have a wider range, as subsequent investigation will show, while others, like the very distinct *Abama americana*, *Sporobolus torreyanus*, *Eupatorium resinosum* and *Chrysopsis falcata*, are probably truly local.

NEW JERSEY.*

Isoetes riparia M.	Bidens trichosperma tenuiloba PB, c,
Juncus cæsariensis PB.	CM.
Eupatorium resinosum PB.	Senecio crawfordii M.

NEW YORK—NEW JERSEY.

Paspalum prostratum [to Del.] M. c.	Scleria minor PB, CM.
Sporobolus torreyanus PB, CM.	Eupatorium album subvenosum PB.

NEW JERSEY—DELAWARE OR MARYLAND.

Isoetes saccharata M.	Hypericum virg. ovalifolium PB, CM.
Eriocaulon parkeri M, c.	Hydrocotyle canbyi CM.
Abama americana PB.	Bidens bidentoides M.
Callitriche austini [from Ct.] M.	

MASSACHUSETTS TO NEW JERSEY.

Cyperus grayi PB, c.	Sisyrinchium arenicola M.
Scirpus longii PB.	Chrysopsis falcata PB.

MASSACHUSETTS TO MARYLAND OR DELAWARE.

Lycopodium chapmanii c, PB.	Hicoria microcarpa M.
Najas gracillima M.	Falcata pitcheri M, CM.
Scirpus planifolius M.	Iva oraria c.
" fluviatilis M.	Solidago neglecta, M, PB, CM.
Carex seorsa M.	Aster spectabilis M, PB, CM.

* Some of these occur also in eastern Pennsylvania.

BOTANICAL SUBDIVISIONS OF THE NEW JERSEY COASTAL PLAIN.

Passing now to the consideration of the subdivisions of the New Jersey coastal plain, we find several very well marked areas.

As we cross southern New Jersey from west to east we are first struck by the sharp line of demarcation between the farming district of West Jersey and the Pine Barrens; crossing the latter we find on the coast a narrow belt separating the Pines from the maritime marshes, which has essentially the same flora as the West Jersey region, a flora that is also shared by the coast islands, although they have some additional elements peculiar to themselves. Southward in the Cape May peninsula we find the West Jersey and coast strips coming together to the partial extinction of the Pine Barrens which exist only as detached islands, while especially at the southwestern extremity of the peninsula we encounter a floral element quite different from the Pine Barrens, but related in no small degree to the flora of southern Delaware.

We thus have five distinct floral districts in southern New Jersey—(1) The West Jersey, or better, the Middle District, which covers not only the Delaware Valley region south of Trenton, but also all the country below the fall line and north of the Pine Barrens which terminate at Long Branch; (2) The Pine Barrens; (3) The Coastal Strip; (4) The Cape May District, south of the Great Cedar Swamp; (5) The Maritime District.

The northern half of the State is referred to as the Northern District without attempting to subdivide it, since it is only indirectly concerned with the present discussion. For an account of its relationship cf. Stone, Ann. Rep. N. J. State Museum for 1908, pp. 31-32.

Some attempt has been made to correlate these areas or parts of them with underlying geological formations, but a more accurate knowledge of the distribution of their plants shows that such correlation is not possible. The surface soil has far more to do with the matter than the underlying geological formation.

The western boundary of the Pine Barrens is often the eastern edge of the cretaceous formation, but in the southern part of

the State it is not so, the cretaceous lying in some places fifteen or twenty miles west of the Pines. In the same way the very distinct coast strip with its West Jersey flora is geologically the same formation as the Pine Barrens.

In West Jersey, moreover, we find considerable differences in the flora of different parts of the same formation. In the cretaceous, for instance, we have in the rich marl beds one style



Fig. 2.—Range of *Lobelia cardinalis* covering Middle and Coast Districts, but absent from the Pine Barrens.

of vegetation, while on sand deposits of the same age are plants of quite a different sort.

A number of species are restricted to one or other of the above-defined districts, some are common to two or three of them, and still others are found throughout our region or throughout the State.

Using the initial letters to indicate the several districts, the distribution of the plants of the New Jersey coastal plain as indicated by the data that we have collected is as follows:



Fig. 3.—Range of *Polygala brevifolia*. Central Pine Barrens only.

Halophytes of the	}	71	M+PB, ...	84
coast marshes and			M+CM, ...	100
beach strand, ...	}	16	PB+C, ...	9
Coast strip only, ...			PB+CM, ...	22
			C+CM, ...	18
Middle district only,	}	343	M+CM+PB, ...	142
so far as our region			M+PB+C, ...	50
is concerned, though			M+CM+C, ...	137
many range through			PB+C+CM, ...	10
northern N. J., ...			Throughout, ...	194
Cape May only, ...		35		
M*+C		87	Total,	1373

* M=Middle Dist.; C=Coast Strip; CM=Cape May District; PB=Pine Barrens.

From the above list we may compute:

		<i>After excluding obvious introductions from other districts.</i>
Total Flora of Pine Barrens, ...	565*	386
“ “ “ Coast Strip (excluding Halophytes),..	524	492
“ “ “ Cape May District, ...	658	649
“ “ “ Middle District, ...	1138	1023
Common to Middle and Pine Barren Districts, ...	470*	295
“ “ “ “ Coast Districts, ...	416	410
“ “ “ “ Cape May Districts, ...	573	493
“ “ Pine Barren and Coast Districts, ...	263†	162
“ “ “ Cape May Districts, ...	368	252
“ “ Coast and Cape May Districts, ...	359	337

The status of each species in the above table was ascertained by a careful study of the data presented in the main text of this report after excluding such records as bore evidence of being based upon accidental occurrences such as roadside or railroad introductions. All weeds, even those of native origin, were also excluded, as their distribution has little or no bearing upon natural conditions.

A further study of the data covering the general range of the south Jersey plants (see p. 47) gives the following results for the flora of each of the four districts considered separately:

	M.	PB.	C.	CM.
Wide Ranging, ...	628	153	301	359
Northern Element, ...	78	28	26	16
Southern Element, ...	299	183	159	263
Local Element, ...	18	17	6	11
	1023	386	492	649
	M.	PB.	C.	CM.
Percentage of Southern Element, ...	29%	48%	31%	40%

* As explained beyond, these figures include a number of recent introductions not really native to the Pine Barrens. See p. 101.

† These figures are somewhat misleading, as only such Pine Barren species as reach the Coast Islands are included. The mainland coast strip is so narrow that it is impossible to mark it off sharply from the Pine Barrens, and we cannot say which Pine Barren species spread into it and which do not, without a vast amount of further study.

It is impossible to compute the percentage of the northern element in the flora for the reason that accurate data are lacking on the actual southern boundary of the range of the species listed above as "Wide Ranging." The only fact given in the manuals as a rule is the southernmost State touched by this boundary. It is known that a large number of the 628 species of the Middle District barely touch the coastal plain on its western or northern edge, and really find the southern limit of their range all the way from New Jersey to Florida, and thus belong distinctly to the northern element of our flora. Other species, on the contrary, are found pretty generally over the coastal plain, and are truly wide ranging, but accurate data for the proper disposition of all the species in one class or the other are not at present available. Figures based entirely upon the character of their occurrence in New Jersey (p. 43) would indicate that at least three-quarters of these wide-ranging species reach their southern limit at the coastal plain, but a study of their distribution to the southward might not uphold this estimate.

A further analysis is given in the consideration of the flora of each of the several districts which follows.

THE PINE BARRENS.

The Pine Barrens are of especial interest from the fact that the region is one of the largest in the Middle States in which anything like primeval conditions remain. Always sandy and thickly covered with more or less scrubby vegetation, interspersed with swamps and infested by hordes of mosquitoes, settlers have been in no hurry to clear it so long as more valuable land was available to the westward. Even to-day one may travel for ten or fifteen miles in some parts of the Barrens without seeing a habitation of any sort, and this within fifty and thirty miles respectively of New York and Philadelphia. Wagon roads lead across the white sand to the sea at infrequent intervals, and ill-defined trails branch off to former charcoal clearings, all of these highways largely fallen into disuse since the establishment of railroads and the abandonment of the old iron forges. The oldest towns in the district are those located on navigable tide-

water streams like Toms River, Mays Landing, Millville, etc.; others, like Hammonton, Vineland and Egg Harbor City, owe their establishment to the railroads.

In recent years many other settlements are springing up along the railroads, and are spreading their clearings into the wilderness, while various agencies exert an important influence on vegetation.

Portable sawmills are cutting all the white cedars, and in place of the dark swamps we encounter mountains of yellow sawdust. The extension of cultivated cranberry bogs proves the death knell to many native bog plants, which do not seem able to stand the flooding. The onslaught of the Christmas venders upon the mistletoe has practically exterminated it, while berry-bearing holly is becoming scarce, and the sale of arbutus and pyxie must soon affect their abundance in certain localities. The wood pulp industry makes a market for any sort of timber, no matter what size; the use of sphagnum for packing bulbs and garden plants for shipment makes it worth while to rake some of the small bogs completely clear of this moss which is so necessary for the growth of many native bog species, and the demand for native shrubbery for planting on large estates has practically exterminated the laurel in certain regions, many carloads of these bushes being shipped at one time by a single dealer.

The advent of the automobile, too, has forced the substitution of good roads for the old sand trails in many places, and hundreds of people now visit certain remote parts of the barrens to one who went there ten years ago.

All these influences are bound to make changes in the flora of the region in the near future, and it is none too soon to make a serious effort to record its characteristic features and its component species before it is too late.

Although the New Jersey Pine Barrens have been well known as a locality for choice plants since the earliest days of botanical study in America, nevertheless very little has been published regarding their flora or even their history and physical features. We know, from casual mention in the descriptions of new species, that Rafinesque, Pursh, Nuttall and Zaccheus Collins were familiar with their barren sands and deep swamps. We know,

also, that James Goldie, the Scottish botanist, traveled through them early in the nineteenth century, and earlier still Peter Kalm, the Swede, probably touched the western border of the region, as he secured the *Hclonias* and submitted it to Linnæus for description.

William Bartram and, probably, John Bartram, his father, were undoubtedly familiar with the "Pines" and were probably the first botanists to explore the region, although they, so far as I am aware, published nothing relative to it.

In Edwards' Gleanings of Natural History, London, 1758, where are described a number of birds submitted by William Bartram to the author, we find a figure of the "Gentian of the Desert" reproduced from a drawing by Bartram, which is clearly *Gentiana porphyrio*, so characteristic of the remote portions of the Pine Barrens. Some of the plants sent by Bartram to Linnæus and named by the latter, such as *Blephariglottis blephariglottis*, the white-fringed orchis, undoubtedly came from the New Jersey coastal plain, although Linnæus records them from Pennsylvania, the name of Bartram being so closely identified with the latter State that it was taken for granted that all his local collections came from there.

During the first half of the nineteenth century the barrens were visited by wagon from Philadelphia or Burlington and there was considerable travel over the long sandy roads, as the fishermen-farmers of the coast were constantly bringing their produce across the State to market and returning with necessary supplies.

Audubon made the journey across to Great Egg Harbor on one of these produce wagons and describes the trip in his episode entitled "Great Egg Harbour," p. 606, vol. III of his Ornithological Biography. There were several half-way houses and other taverns where travelers could rest and procure refreshments, and a number of forges—many of them now only names on the map—were extracting iron from the bog ore which before the discovery of better deposits in the west had a marketable value.

Dr. John Torrey, when twenty-two years of age, made a wagon trip from Philadelphia to South Amboy during the latter part of June, 1818, in company with William Cooper, and, fortunately,

a record of it is preserved in a letter to Zaccheus Collins in the possession of the Philadelphia Academy.* It runs as follows:

NEW YORK, July 9th, 1818.

DEAR SIR:

We arrived at South Amboy one week after we left Philadelphia, and, although our journey was rather an arduous one, we think ourselves well rewarded for all the privations we endured. The principal difficulty we experienced was in keeping the right road. Hundreds of these little roads cross each other in every direction like a labyrinth, so that it is next to a miracle if you hit the right one. We remained two days at Thompson's Tavern [at Quaker Bridge], where we were very well entertained. About this time we found a considerable number of plants which were new to us, indeed there were few plants but what we found here. The *Drosera filiformis* and *foliosa* (?) were abundant, as well as two species of *Utricularia*, one of which does not appear to be described. What pleased us more than any plant we found was the *Schizaea*. Cooper found the first specimen. It is a singular little plant, and I first doubted whether Pursh had referred it to the right genus, but subsequent examination has convinced me that he is right. The whole of the plant which we saw was confined to a very small space. There is a small patch of it about forty-five yards from the west end of the bridge on the left side as you approach it from Philadelphia and about twelve feet from the road. I have been particular to mention its locality, as this is the only spot where we found it. We found abundance of the *Leiophyllum* and *Hudsonia*, some of them in flower. The latter plant I am inclined to think is a different species from the one which grows on the seacoast. At first sight you are struck with the long peduncled flowers of the one and the almost sessile flowers of the other. We found two species of *Eriocaulon*—one common, tall and with large hemispherical heads and tuft of short leaves at the base, the other smaller, with large leaves. They are both ten-striate.

After we had left Quaker Bridge we fared pretty hard. Some places called Taverns that we put up at were not fit for an Arab. At a place called the Ten-mile Hollow, or Hell Hollow, we expected to sleep in the woods, for it was with difficulty that we persuaded them to take us in. This was the most miserable place we ever saw; they were too poor to use candles. No butter, sugar, etc. A little sour stuff, which I believe they called rye bread, but which was half sawdust, and a little warm water and molasses, were all we had for breakfast. For supper I could not see what we had, for we ate in the dark. From this place until we reached Monmouth we found scarcely a single plant in flower.

We found near Philadelphia a species of *Plantago* which may be new. It is not described in Persoon, but it may be the *P. linearifolia* of Muhl. Cat. 2d ed. I shall send you specimens of it together with most of the plants we collected on our journey. I hope you will indulge me if I trouble you in this way once in awhile.

I remain, sir, with the greatest respect, etc., yours,

JOHN TORREY.

* Published in Bull. Torr. Bot. Club VI, p. 83.

If there is any young botanist in your society that would be willing to commence botanical correspondence and exchange of specimens with me, I should be very glad to commence one immediately.

To ZACCHEUS COLLINS, ESQ., Philadelphia.

There were other ways of getting to the coast in these early days. An advertisement in a copy of Poulson's American Daily Advertiser, July 12th, 1823, states that "The subscriber [Seth Crane] respectfully informs the public that he has commenced running a stage between Mount Holly and Mannahawkin for the accommodation of persons disposed to visit the Grouse Plains, Mannahawkin or Tuckerton. The Stage will leave Mannahawkin every Monday and Thursday mornings at 6 o'clock and arrive at Griffith Owens' Tavern, in Mount Holly, same afternoon at 4 o'clock. From whence passengers will be conveyed to Burlington on the following morning in time to meet the Steam Boat for Philadelphia and Trenton. Returning will leave Mount Holly every Wednesday and Saturday morning at 6, and arrive at Mannahawkin same afternoon at 4 o'clock. Where Ladies and Gentlemen can be accommodated with genteel Boarding and Lodging at the moderate rate of \$3 per week; and conveyed at any time across the Bay to James Cranmer's, Hazleton Cranmer's or Stephen Inman's. Fare through \$1.75 cents.

A conveyance will be in readiness at Mannahawkin for Tuckerton."

In the same paper are advertised a line of stages, and the "Union" and "Good Intent" lines of four-horse carriages direct to Tuckerton from Philadelphia. There was also the steamboat "Delaware," leaving Philadelphia for Cape May "at five o'clock in the morning on Monday and Friday during the bathing season."

Prof. S. F. Baird, when a young man, used to visit Beesley's Point, on Great Egg Harbor, by way of Cape May, going down by boat and up the coast by stage. In July, 1854, however, John Cassin, of the Philadelphia Academy, in a letter to Baird, tells him that a railroad to Absecon has been completed with stage connection for Beesley's Point, which will greatly facilitate his future trips.

It was many years later before the railroad was built to Cape May, which had always been rather inaccessible except by water. Indeed, prior to 1707, there was no wagon road out of the peninsula, merely horse paths through the dense cedar swamps which stretched away from Cedar Swamp Creek to Dennis Creek, forming an effectual barrier to traffic and making Cape May virtually an island.*

With the advent of the railroads traffic on the old stage roads practically ceased and with it went the taverns and forges, so that the latter part of the nineteenth century found the remote parts of the Pines more of a wilderness than they were before.

Within the past decade several botanical trips have been made across the Pine Barrens which have been recorded in print.

Mr. C. F. Saunders has a charming account of a wagon trip from Tuckerton to Atsion, July 3-5, 1899,† in company with Mr. W. N. Clute. His picture of the country is very vivid. He says, after leaving Tuckerton: "Mile after mile of oak and pine barrens were passed without sign of human habitation, and when five miles were registered we came to the spot which is marked upon the maps as Munyon Field. Here, in old times, had been a house, and a family had lived here, scratching some sort of a living from the sand and fattening hogs on the abundant mast which strewed the ground under the little chinquapin oaks. Now no vestige of human occupation remains save a little clearing, which is rapidly filling up with wildings from the surrounding forest. * * * Two or three miles more of a similar wilderness, and the forest growth thinned out and dwindled down to dwarf proportions as we emerged upon the rolling heathlike expanse of the east or lower plains. * * * Nothing could be more restful to the eye than this rolling expanse of green plain, melting away in every direction into the misty distance, the white sand gleaming out here and there like whitecaps on an emerald sea. * * * The luxuriant vines of the bearberry lay sprawling everywhere in the sun, their dry, astringent berries not yet tinged with the crimson that makes them so conspicuous

* Cf. Dr. Maurice Beesley's *Early History of Cape May*, in the *Geology of the County of Cape May*, 1857.

† *Proc. Acad. Nat. Sciences, Phila.*, vol. 52, 1900, pp. 544-549.

in winter, the pyxie, trailing arbutus, hudsonia, laurel, tephrosia and leiophyllum were so abundant that the whole place must have been like a garden in the spring. * * * After leaving the plains, the old road wound now through dry sandy pine woods, bare of conspicuous flowers, save, perhaps, for the ever present *Melampyrum lincare* and the yellow banners of *Baptisia tinctoria*—now through damp swamp lands, where we had as roadside companions the thread leaved sundew's purple flowers, the orange heads of *Polygala lutca*, the magenta blossoms of the grass pink and the snake-mouth pogonia. * * *

Two years later the writer, accompanied by Messrs. H. L. Coggins and J. A. G. Rehn, crossed from Medford to the plains and back, June 17-22.

In Mr. Coggins' account* of the trip, which deals with ornithology rather than botany, occurs the following admirable picture of the plains: "A singular region, hot, level and dry. We wade into the scrub scarce able to believe that it is over the top of a dwarf forest that we are gazing for miles. Its barrenness, except for the stunted vegetation, recalls vividly to mind long forgotten descriptions of desert regions. The heat rising from the parched ground gives a blur of uncertainty to distant outlines, and we close our eyes involuntarily before the glare of the sun on the exposed gravel areas. Chewinks and brown thrashers scuffle listless in the dry soil. A mere speck in the sky, a turkey vulture, circles lazily for a time then drops from view beyond the horizon. A little tree lizard at our step scurries across a gravel patch and disappears under the dry leaves. The only other sound of life is the weary vibrant trill of the prairie warbler, which rises on the hot air like a supplication for life."

Trips through the pines, even with the certainty of much botanical reward, have drawbacks which are liable to make one hesitate, as Mr. Saunders truly says: "The sands are heavy, the flies and ticks and mosquitos are numerous, the heat is excessive, springs are few and far between and forest fires are apt to be at their devastating work." At the same time thoughts of the pungent odor of the pines, the cool shade of the cedar swamp,

* Cassinia, 1902, p. 26.

where the road runs through, with its white bridge spanning the dark tea-like water of the stream; the refreshing draught of the water itself, always palatable in spite of its dark color; the fragrance of the magnolia, azalea and clethra, and the beauties of the ever attractive pine barren flowers, all tend to obliterate the memory of clouds of mosquitos and dripping perspiration and draw the naturalist back again and again to this wonderful wilderness.

The streams of the pine barrens are navigable by canoe, and many a trip has been made over their dark waters. One of these is admirably described by Henry Vandyke in his delightful sketch "Between the Lupin and the Laurel," and in it the reader will find an excellent account of the pine barrens in spring time.*

As one enters the Pine Barrens from the agricultural region of Western Jersey, the most striking feature, apart from the Pines themselves, is the continuous shrubby undergrowth of Bracken *Pteridium aquilinum*, Sweet Fern *Comptonia asplenifolia* and Chain Fern *Woodwardia virginica*. Then the absence of such familiar trees as the Wild Cherry *Prunus serotina*, Sweet Gum *Liquidambar styraciflua*, Willow Oak *Quercus phellos*, etc., and the presence of White Birch *Betula alba*, and the abundance of Sassafras *Sassafras sassafras*, Sour Gum *Nyssa sylvatica*, Chestnut Oak *Quercus prinus* and the Scrub Oaks *Q. ilicifolia*, *marylandica* and *prinoides*. The White Oak *Q. alba*, Black Oak *Q. velutina* and Post Oak *Q. stellata*, occur in the outlying portions of the Pine Barrens or locally throughout, but the first two are often rare over large areas.

The abundant pine is the Pitch Pine *Pinus rigida*. The Yellow Pine *Pinus echinata* occurs, locally, sometimes in large tracts, but in other sections is absent.

The forests of the Pine Barrens to-day present considerable diversity, due to the inroads of fire and axe, and my efforts to ascertain from old residents just what the primitive condition was have resulted in such contradictory information that I am in doubt as to just what should be said on the matter.†

*Cf. also Gustave Kobbe, "The New Jersey Coast and Pines." C. C. Abbott, "Days Out of Doors."

† Cf. for detailed discussion of N. J. Forests. Cf. Reports in Ann. Rept. State Geologist.

There are woods of rather tall Pine with practically no oaks of any size, but with an undergrowth of Scrub Oaks and Huckleberries.

Then there is a more open growth in which Oaks and Pines mingle in about equal proportion and in which the Oaks, mainly *Q. marilandica*, reach a fair height.

Other sections are covered with a dense growth of Oaks, including *Q. prinus*, *alba*, *marilandica*, *ilicifolia* and *velutina*.

It seems to me that the first two types are the natural or primitive ones, while the solid Oak growth covers recent clearings. The Pines spring up again in such tracts and reassert themselves unless fire or continuous clearing have exterminated them. Indeed, it is remarkable to see how rapidly young Pines will develop. In old abandoned open ground which has grown up in *Andropogon* grass the Pines will soon establish themselves and grow rapidly. Equally rapid growth is seen on the bottom of sand excavations along the railroads where a ridge of eight or ten feet in height has been entirely removed for grading purposes somewhere else, and in a few years the floor will be completely covered with the regular forest vegetation with flourishing young Pines on all sides.

The typical open Pine forest (see Pl. CXXVII) is characterized by the following species:

<i>Pteridium aquilinum</i> .	<i>Helianthemum canadense</i> .
<i>Pinus rigida</i> .	<i>Baptisia tinctoria</i> .
<i>Panicum commonsianum</i> .	<i>Kalmia angustifolia</i> .
“ <i>addisoni</i> .	<i>Pieris mariana</i> .
“ <i>columbianum</i> .	<i>Epigaea repens</i> .
<i>Andropogon scoparius</i> .	<i>Vaccinium vacillans</i> .
“ <i>virginicus</i> .	<i>Gaylussacia baccata</i> .
<i>Smilax glauca</i> .	<i>Hieracium venosum</i> .
<i>Quercus ilicifolia</i> .	<i>Aster concolor</i> .
“ <i>marilandica</i> .	“ <i>patens</i> .
“ <i>stellata</i> .	<i>Sericocarpus asteroides</i> .
<i>Comptonia asplenifolia</i> .	<i>Solidago odora</i> , etc.
<i>Sassafras sassafras</i> .	

In bare open sandy patches occur Lichens of several species, together with:

<i>Cyperus grayi</i> .	<i>Arenaria caroliniana</i> .
" <i>filiculmis macilentus</i> .	<i>Lechea racemulosa</i> .
<i>Carex umbellata</i> .	<i>Euphorbia ipecacuanhae</i> .
<i>Hudsonia ericoides</i> .	<i>Cracca virginiana</i> .

The Cedar swamps (see Pl. CXXVII) which line all the streams of the Pine Barrens possess quite a different flora, some of the characteristic species being:

<i>Chamaecyparis thyoides</i> .	<i>Rhus vernix</i> .
<i>Magnolia virginiana</i> .	<i>Carex folliculata</i> .
<i>Acer rubrum carolinianum</i> .	" <i>trisperma</i> .
<i>Clethra alnifolia</i> .	<i>Drosera rotundifolia</i> .
<i>Nyssa sylvatica</i> .	<i>Osmunda cinnamomea</i> .
<i>Alnus rugosa</i> .	<i>Vaccinium corymbosum</i> .
<i>Ilex glabra</i> .	" <i>atrococcum</i> .
<i>Viburnum nudum</i> .	<i>Azalea viscosa</i> .

The natural open bogs are characterized by the presence of such species as:

<i>Oxycoccus macrocarpon</i> .	<i>Eriocaulon decangulare</i> .
<i>Sarracenia purpurea</i> .	" <i>compressum</i> .
<i>Orontium aquaticum</i> .	" <i>septangulare</i> .
<i>Castalia odorata</i> .	<i>Drosera longifolia</i> .
<i>Nymphæa variegata</i> .	<i>Polygala lutea</i> .
<i>Utricularia</i> spp.	<i>Blephariglottis blephariglottis</i> .
<i>Pogonia ophioglossoides</i> .	" <i>cristata</i> , etc. etc.*
<i>Limodorum tuberosum</i> .	

The curious elevated tract known as the Plains (see Pl. CXXVIII.), which covers portions of Burlington and Ocean Counties, presents a stunted vegetation scarcely higher than one's knees, consisting mainly of *Pinus rigida*, *Quercus marilandica* and *Q. ilicifolia*, but with all the characteristic species of the open pine woods. The additional species more or less peculiar to the Plains are *Corema conradii* and *Arctostaphylos uva-ursi*.

*The above lists are by no means exhaustive, and are simply given to call attention to some of the dominant or more conspicuous species of the several types of environment to be found in the Pine Barrens. No attempt has been made toward an "ecological" study of the region. While much valuable work has been done along true ecological lines, a certain amount of discredit appears to have been thrown upon the term by the fragmentary and superficial work presented under this title by certain writers. The hasty division of a flora into various societies and associations is a case in point. To my mind the only proper basis for work of this kind is the detailed study of a number of similar spots in a given area, such as the various patches of

Mr. Gifford Pinchot published an account of the Plains in the Annual Report of the State Geologist of New Jersey for 1898, and from this I have taken most of the following figures. Mr. Pinchot's conclusions agree entirely with my own observations in this interesting region.

The Plains occupy the highest part of the central Pine Barrens, ranging from 100 to 200 feet above sea level. They stretch from a point three miles east of Woodmansie south nearly to Munyon Field, varying from two to four miles wide, and are bisected by the Oswego river and its adjoining swamps. The upper section lying west of Cedar Bridge constitutes the West Plains, the lower the East Plains, the location of the former on the U. S. Geological Survey Maps being entirely wrong.

The West or Upper Plains comprise 7,737 acres and the East or Lower Plains 6,662, though with outlying tracts of similar character this region of stunted vegetation probably covers an area of nearly 20,000 acres.

The soil is exceedingly poor, consisting largely of white sand and coarse white pebbles, but it is no different in composition or in aridity from that of other dry sections of the Pine Barrens. Mr. Pinchot found that the Pine trees, such as had developed trunks with sufficiently well marked rings for counting, averaged about thirteen years in age, though one three feet high was thirty-one years old.

Most of the Pines, however, consist of sprout growth from old stumps which have been burned back by countless fires, some being almost globular burls with slender radiating stems. There are also numerous seedlings with prostrate stems. Occasionally a tree will approach a normal height of six to fifteen feet, but they are rare and usually killed by fire.

Jersey Pine woods in the middle district of the region here considered or the various cedar swamps of the Pine Barrens. By a comparison of results it will be possible to determine what species really do occur in close association in all such similar locations. The establishment of such associations upon a few days' study seems utterly unwarranted, and when, as is usually the case, the same author proposes a different lot of "associations" for every area he studies, the utility of the whole method is called into question.

Furthermore, some writers on "ecology" are so careless in the systematic side of their work that their papers abound in misidentifications which, of course, render them practically worthless.

The prostrate character of the trees reminds one strongly of timber line vegetation on high mountains and is doubtless due to the elevated, exposed and wind-swept nature of the region, conditions congenial to the *Arctostaphylos* and *Corema*, which here reach their southern limit.

Add to this the constantly recurring fires which help to maintain the above conditions and the slow growth of all the trees in the most arid parts of the Pine Barrens, and we probably have all the factors necessary to explain the conditions found on the plains.

It seems likely that the Indians were in the habit of burning off this region long before the advent of the whites, and early intensified original conditions, a practice that the accidental fires of later years have perpetuated.

The term Pine Barrens has been used very loosely by those who have written upon the plants of New Jersey.

Rev. L. H. Lighthipe* refers all of southern New Jersey below the triassic to the Pine Barrens.

Dr. Arthur Hollick† limits it to the portion lying south of a line from Long Branch to Salem.

Mr. C. C. Vermuele‡ gives it as "practically all of that portion of the State southeast of a line from Seabright to Glassboro and thence through Bridgeton to Delaware Bay." Both of these latter statements are based exclusively upon a study of forest trees, and as a result of careful field studies on the same line Mr. Vermeule (Ann. Rept. State Geol. N. J., 1898, p. 185) limits the coniferous forest to the region east of a line beginning at Asbury Park and passing through Farmingdale, Brindletown, New Lisbon and Taunton, with a considerable indentation south of Vincentown; thence to Atco, Andrews, Iona and south along the Maurice river. The belt between this and the previous line, he states, is composed of mixed coniferous and deciduous forest.

My studies, based upon herbs and shrubs as well as trees, show that the western border of the Pine Barren botanical region coin-

* *Torrea* II, p. 79.

† Report on Forests, Ann. Rep. N. Y. State Geologist for 1899, 182.

‡ Do. p. 16.

cides very closely with Mr. Vermeule's boundary of the coniferous forest (see colored map), the only important differences being some projections to include outlying Pine Barren "peninsulas" or "islands," especially the region southeast of Clementon, and the exclusion of the coast strip, a similar strip along the bay shore from Port Norris to Dennisville, which belongs to the Middle or West Jersey district, and the Cape May peninsula south of the great Cedar Swamp, which, although it contains some Pine Barren "islands," is mainly coastal and West Jersey in its affinities, as already explained.

The errors in most attempts to outline the Pine Barren region were due to a total lack of knowledge of the southwestern portion of the State, the prevailing idea being that the Pines must cover all of the yellow gravel tertiary area, while as a matter of fact they stop short at the Maurice river, the region west of this, especially north of Bridgeton, being fine farm land, often rolling with patches of deciduous forest here and there.

The boundary line between the Pine Barrens and the "Middle" and "Coastal" districts which bound it, respectively, on the west and east, is not a straight or sharp one; narrow tongues of the two floras interlace and often both elements will be found in the same bog or swamp along the border line. On the east, moreover, the peculiar coastal flora will be found running up the tidewater streams and their tributaries well into the Pine Barrens as far, for instance, as Toms River, Batsto, Mays Landing and Millville, where artificial dams now seem to mark the limit of the coastal intrusion. On other streams the coast plants follow back to the natural limit of tidewater, and perhaps some isolated colonies of such species well within the Pine Barrens owe their presence to the intrusion along tidewater streams that were subsequently dammed. In grouping the records in the systematic part of this report the same locality may often be put in one district under one species and another under another, when it is located on the border line between the two. Mays Landing, for instance, is cited as a Pine Barren locality for the Pine Barren species occurring above the dam, while when cited in connection with the coastal plants occurring below the dam, it is placed in the Coastal district. In addition to the main Pine Barren district

there are in the Middle or West Jersey districts certain "Pine Barren" islands, where a number of characteristic Pine Barren plants occur, often associated with species of wide range or others typical of the Middle district. One of the most important of these is the so-called Sandhill region of Middlesex Co., while Griffith's Swamp (now destroyed) near Lawnside, Camden Co., was famous in the past. Prof. J. B. Smith has indicated several of these islands in his map (Ann. Rept. N. J. State Museum for 1909), but they do not seem sufficiently well marked or equal in character to warrant such recognition.

There seems to be no peculiar geological formation correlated with these outlying colonies except that dry ground species are found where deposits of pure white sand or gravel occur, but which are not necessarily of the same age as similar deposits in the Pine Barren area proper.

Intrusions of the Middle district flora into the Pine Barrens in the form of narrow tongues along the boundary line have already been alluded to, but there are also occurrences of similar species well within the region, where extensive clearings have been effected and maintained for long periods of years; such occurrences can, I think, be safely regarded as intrusions from the Middle district, analogous to the occurrence of weeds in all spots that are brought under cultivation.

The attempts that have been made to list the typical plants of the Pine Barrens are in some respects as misleading as the efforts to outline the district, due, of course, to the fact that the writers were only familiar with a portion of the region or were relying entirely upon compilation.

Dr. Britton's list of fifty Pine Barren species* comprises twenty-five that are as common in the Middle district as in the Pines, and six that are distinctly Middle district species and do not occur in the Pine Barrens—*Desmodium viridiflorum*, *Phlox subulata*, *Quercus phellos*, *Stipa avenacea*, *Juncus scirpoides*, *Eleocharis melanocarpa*.

Rev. Mr. Lightpipe's list† contains the following, which are not found at all in the Pine Barrens, or are very rare: *Onoclea sensi-*

* Bull. Torr. Bot. Club VII., p. 82; XI., p. 126.

† Torreyia II., p. 79.

bilis, *Equisitaceæ*, *Pinus virginiana*, *Uniola laxa*, *Stipa avenacea*, *Chamaelirium luteum*, *Pogonia divaricata* (one record), *Quercus phellos*, *Castanea pumila*, *Liquidambar styraciflua*, *Nelumbo lutea*, *Viola atlantica*, *Asalea nudiflora*, *Salvia lyrata*. Also the following, which were apparently wrongly attributed to New Jersey: *Aletris aurea* and *Chondrophora*.

Mr. Roland Harper* gives as species confined to the New Jersey Pine Barrens, or much commoner in New Jersey than in adjoining States, *Dicromena colorata* and *Aletris aurea*, of which we have no definite records, and *Eriocaulon parkeri*, a middle district plant which does not occur in the Pine Barrens. *Polygala lutea*, *Clethra alnifolia* and *Sabatia lanceolata* are given in his list of characteristic North Carolina Pine Barren plants, but omitted from the New Jersey list, though it would be hard to find more generally distributed species in the latter region.

An analysis of the Pine Barren flora based upon the data presented beyond shows the following numerical results:

Total number of species growing in the Pine Barrens exclusive of weeds,	565
Species occurring only locally in long-settled spots, obviously intrusions from the Middle or other districts, ...	179
True Pine Barren Flora, ...	386

Of these there are:

Common to the Middle District, ...	295
“ “ “ Coast Islands, ...	162
“ “ “ Cape May District, ...	252
Not found elsewhere in New Jersey, ...	55
“ “ “ “ the world, ...	2†

Systematically they may be grouped as follows:

Pteridophytes, ...	11
Gymnosperms, ...	8
Monocotyledons Gramineæ, ...	44
Cyperaceæ, ...	55
Others, ...	59
	158
Dicotyledons Polypetalæ, ...	100
Monopetalæ, ...	114
	214

* Torrey's VII, 42.

† *Juncus casariensis*, *Eupatorium resinosum*.

76 REPORT OF NEW JERSEY STATE MUSEUM.

In relation to their general range they may be grouped as follows:

WIDE RANGING.

Throughout North America, ...	5
Canadian Provinces to Virginia-Florida, ...	72
Maine-New Hampshire to Virginia-Florida, ...	76
	153

NORTHERN ELEMENT.

Plants ranging south to.....	N. J.	Del. or Md.
From Labrador, ...	3	0
Newfoundland, ...	10	3
New Brunswick, ...	0	3
Nova Scotia, ...	2	2
Maine, ...	3	2
	18*	10

SOUTHERN ELEMENT.

Plants ranging north to.....	N. J.	So. N. Y.	R. I. or Ct.	Mass.
From Virginia, ...	1	1	1	4
N. Carolina, ...	5	0	1	3
S. Carolina, ...	4	0	1	2
Georgia, ...	5	3	3	4
Florida, ...	55	29	18	48
	70*	33	24	67

LOCAL ELEMENT.

New Jersey only, or N. J.-Del., ...	5
N. J.-Southern N. Y., ...	3
N. J.-Mass., ...	5
Del.-Mass., ...	4
	17

LIST OF NEW JERSEY PINE BARREN PLANTS.

I. *Characteristic Pine Barren Species.*†—Those which occur locally or as stragglers in other districts are so indicated by the initial letters of the districts, *i. e.*, M, Middle; C, Coast; C M, Cape May.

* Detailed lists on pp. 49-56. The number of species there attributed to the Pine Barrens may differ a trifle from the totals here given due to additional data on distribution received after these figures were compiled.

† A few species which occur only in the Pine Barrens or in the Middle District and Pine Barrens are omitted from these lists since they are rare and not typical, but they are, of course, included in the numerical statement.

- Schizæa pusilla* (c).
Dryopteris simulata.
Lycopodium chapmanii (c, cm).
 " *alopecuroides* (cm).
 " *carolinianum* (c, cm).
Chamæcyparis thyoides (m).
Pinus rigida (m, c, cm).
Sparganium americanum.
Potamogeton oakesianus (cm).
 " *confervoides*.
Sagittaria longirostra (cm).
Erianthus saccharoides.
Panicum longifolium (cm).
 " *meridionale* (c, cm).
 " *leucothrix*.
 " *spretum* (c, cm).
 " *ensifolium* (cm).
 " *clutei* (cm).
 " *lucidum* (c, cm).
 " *scabriusculum*.
 " *cryptanthum*.
 " *commonsianum* (c, cm).
 " *columbianum thinium* (m, c, cm).
Amphicarpum amphicarpum (cm).
Sporobolus serotinus (m).
 " *torreyanus* (cm).
Calamovilfa brevipilis.
Agrostis elata (cm).
Danthonia epilis.
Cyperus cylindricus (m, c, cm).
 " *dentatus* (m).
Eleocharis robbinsii (m).
 " *torreyana* (cm).
 " *tuberculosa* (m, c, cm).
 " *tricostata* (m, cm).
Scirpus subterminalis (cm).
 " *longii*.
Eriophorum tenellum (m, cm).
Rhynchospora pallida (m, cm).
 " *oligantha*.
 " *alba* (m, c, cm).
 " *knieskernii*.
 " *filifolia*.
 " *gl. leptocarpa*.
 " *axillaris*.
 " *axillaris microcephala*.
 " *fusca* (cm).
 " *gracilentia* (cm).
 " *torreyana* (cm).
Cladium mariscoides (c, cm).
Scleria triglomerata (m).
 " *minor* (m, cm).
 " *torreyana* (cm).
Carex bullata (m).
 " *walteriana* (m, c).
 " *livida*.
 " *barrattii* (m, cm).
 " *exilis*.
 " *atlantica* (m).
 " *trisperma*.
Orontium aquaticum (m, cm).
Xyris caroliniana (cm).
 " *congdoni* (m).
 " *fimbriata*.
 " *arenicola*.
Eriocaulon septangulare.
 " *compressum* (cm).
 " *decangulare* (cm).
Juncus aristulatus (c, cm).
 " *militaris* (m).
 " *cæsariensis* (m).
Tofieldia racemosa.
Abama americana.
Xerophyllum asphodeloides (m).
Uvularia nitida.
Smilax tamnifolia (m, cm).
 " *laurifolia* (cm).
 " *walteri* (cm).
Gyrotheca tinctoria (cm).
Lophiola americana.
Gymnadeniopsis integra.
Blephariglottis blephariglottis (m),
 cm).
 " *cristata* (m, cm).
Pogonia divaricata (cm).
Gyrostachys præcox (cm).
 " *vernalis* (c).
Betula populifolia (m, c).
Quercus marilandica (m, c, cm).
 " *ilicifolia* (m, c, cm).
Arenaria caroliniana.
Nymphæa variegata (m, cm).
Brasenia purpurea (m, cm).
Sarracenia purpurea (m, cm).
Drosera filiformis (m, c).
Itea virginica (m, cm).
Meibomia sessilifolia.
 " *stricta* (m).
Lespedeza angustifolia (m, cm).

78 REPORT OF NEW JERSEY STATE MUSEUM.

- Lespedeza oblongifolia*.
Clitoria mariana (M, CM).
Linum floridanum (C).
Polygala lutea (M, CM).
 " *cruciata* (M, C, CM).
 " *brevifolia* (M).
 " *mariana* (CM).
Euphorbia ipecacuanhæ (M, CM).
Corema conradii.
Ilex glabra (M, C, CM).
Acer rubrum carolinianum (CM).
Ascyrum stans (M, CM).
Hypericum densiflorum (M).
 " *virgatum ovàlifolium* (M CM).
Hudsonia ericoides (C).
Lechea minor (M, CM).
 " *racemulosa* (M, CM).
Rhexia mariana (M, CM).
 " *aristata*.
Ludvigia linearis.
 " *hirtella* (CM).
Proserpinaca pectinata (M, CM).
Myriophyllum humile (M, C).
Oxypolis rigidior longifolia.
Azalea viscosa (M, C, CM).
 " " *glauca* (M).
Dendrium buxifolium.
Kalmia angustifolia (M, C).
Pieris mariana (M, C).
Chamædaphne calyculata (M).
Arctostaphylos uva-ursi.
Gaylussacia dumosa (M, CM).
Vaccinium corymbosum (M, C).
 " *virgatum*.
Oxycoccus macrocarpus (M, C, CM).
Pyxidanthera barbulata (M).
Trichostema lineare (M).
Sabbatia lanceolata (CM).
Gentiana porphyrio (CM).
Asclepias rubra (M, CM).
Breweria pickeringii.
Cuscuta cephalanthi.
Gerardia holmiana.
 " *racemulosa*.
Schwalbea americana.
Utricularia cornuta.
 " *subulata* (M, C).
 " *cleistogama* (CM).
 " *inflata* (M, CM).
 " *purpurea* (M, CM).
 " *clandestina* (M).
 " *intermedia* (M).
 " *fibrosa* (M).
 " *virgatula* (CM).
Galium pilosum punctulosum (CM).
Lobelia nuttallii (M, C, CM).
 " *canbyi*.
Nabalus virgatus.
Sclerolepis uniflora (CM).
Eupatorium album (M, C, CM).
 " *album subvenosum*.
 " *resinosum*.
 " *leucolepis* (C, CM).
Lacinaria gramin. pilosa (M, C, CM).
Chrysopsis falcata.
Solidago stricta.
 " *puberula* (M, CM).
 " *erecta* (M, CM).
 " *uniligulata*.
 " *fistulosa* (M, C, CM).
Aster nemoralis (M).
 " *gracilis* (M, C, CM).
 " *spectabilis* (M, CM).
 " *dumosus* (M, C, CM).
Doellingeria umbellata humilis.
Helianthus angustifolius (M, C, CM).
Bidens trichosperma tenuiloba (C, CM).

II. SPECIES COMMON TO BOTH THE PINE BARRENS AND MIDDLE DISTRICT.

- Pteridium aquilinum*.
Woodwardia virginica.
 " *areolata*.
Osmunda cinnamomea.
 " *regalis*.
Pinus echinata.
Potamogeton epihydrus.
Sparganium amer. androcladum.
Andropogon scoparius.
 " *corymbosus abbreviatus*.
 " *virginicus*.
Paspalum setaceum.

- Panicum verrucosum*.
 " *lindheimeri*.
 " *sphærocarpon*.
 " *villosissimum*.
 " *oligosanthes*.
 " *pseudopubescens*.
 " *ashei*.
 " *columbianum*.
 " *addisonii*.
 " *tsugetorum*.
 " *virgatum cubense*.
Aristida dichotoma.
 " *gracilis*.
 " *purpurascens*.
Calamagrostis cinnoides.
Agrostis hyemalis.
Danthonia sericea.
 " *spicata*.
Triplasis purpurea.
Panicularia obtusa.
Festuca octoflora.
Cyperus flavescens.
 " *filiculmis macilentus*.
Eleocharis olivacea.
 " *tenuis*.
Scirpus americanus.
 " *cyperinus*.
 " *eriphorum*.
Fimbristylis autumnalis.
Eriophorum virginicum.
Rhynchospora glomerata.
 " *macrostachya inundata*.
 " *smallii*.
Carex collinsii.
 " *folliculata*.
 " *pennsylvanica*.
 " *umbellata*.
 " " *tonsa*.
 " *canescens disjuncta*.
 " *albulatensis*.
 " *annectens*.
Xyris torta.
Pontederia cordata.
Juncus pelocarpus.
 " *effusus*.
 " *tenuis*.
 " *dichotomus*.
 " *canadensis*.
 " *acuminatus*.
 " " *debilis*.
Zygadenus leimanthoides.
Helonias bullata.
Lilium superbum.
Aletris farinosa.
Smilax rotundifolia.
 " *glauca*.
Hypoxis hirsuta.
Iris prismatica.
Sisyrinchium atlanticum.
Cypripedium acaule.
Gymnadeniopsis clavellata.
Blephariglottis ciliaris.
Pogonia ophioglossoides.
Arethusa bulbosa.
Limodorum tuberosum.
Gyrostachys beckii.
 " *cernua*.
Listera australis.
Populus grandidentata.
Comptonia peregrina.
Alnus rugosa.
Quercus alba.
 " *minor*.
 " *prinus*.
 " *prinoides*.
Polygonella articulata.
Phoradendron flavescens.
Castalia odorata.
Magnolia virginiana.
Drosera longifolia.
 " *rotundifolia*.
Sassafras sassafras.
Rubus hispidus.
 " *villosus*.
 " *cuneifolius*.
Aronia nigra.
 " *arbutifolia*.
Amelanchier intermedia.
Crataegus tomentosus.
Baptisia tinctoria.
Lupinus perennis.
Cracca virginiana.
Stylosanthes biflora.
Meibomia michauxii.
 " *rigida*.
 " *obtusa*.
 " *marilandica*.
Lespedeza repens.
 " *frutescens*.
 " *stuvei*.

80 REPORT OF NEW JERSEY STATE MUSEUM.

<i>Lespedeza hirta.</i>	<i>Cuscuta compacta.</i>
<i>Apios apios.</i>	“ <i>arvensis.</i>
<i>Galactia regularis.</i>	<i>Trichostema dichotomum.</i>
<i>Linum striatum.</i>	<i>Koellia mutica.</i>
<i>Polygala nuttallii.</i>	“ <i>verticillata.</i>
“ <i>polygama.</i>	<i>Lycopus sessilifolius.</i>
<i>Crotonopsis linearis.</i>	<i>Linaria canadensis.</i>
<i>Rhus vernix.</i>	<i>Gratiola aurea.</i>
<i>Illicioides mucronata.</i>	<i>Dasystoma pedicularis.</i>
<i>Ilex laevigata.</i>	<i>Gerardia purpurea.</i>
<i>Ascyrum hypericoides.</i>	<i>Melampyrum lineare.</i>
<i>Hypericum canadense.</i>	<i>Utricularia gibba.</i>
<i>Sarothra gentianoides.</i>	<i>Cephalanthus occidentalis.</i>
<i>Triadenum virginicum.</i>	<i>Diodia teres.</i>
<i>Helianthemum canadense.</i>	<i>Viburnum nudum.</i>
<i>Lechea villosa.</i>	“ <i>cassinoides.</i>
“ <i>leggettii.</i>	<i>Adopogon carolinianum.</i>
<i>Viola lanceolata.</i>	<i>Hieracium gronovii.</i>
<i>Rotala ramosior.</i>	“ <i>venosum.</i>
<i>Decodon verticillatus.</i>	<i>Nabalus trifolius.</i>
<i>Rhexia virginica.</i>	<i>Eupatorium pubescens.</i>
<i>Ludvigia alternifolia.</i>	“ <i>rotundifolium.</i>
“ <i>sphaerocarpa.</i>	“ <i>verbenae-folium.</i>
<i>Chamaenerion angustifolium.</i>	“ <i>hyssopifolium.</i>
<i>Epilobium coloratum.</i>	<i>Chrysopsis mariana.</i>
<i>Nyssa sylvatica.</i>	<i>Solidago bicolor.</i>
<i>Clethra alnifolia.</i>	“ <i>nemoralis.</i>
<i>Rhododendron maximum.</i>	“ <i>odora.</i>
<i>Kalmia latifolia.</i>	“ <i>neglecta.</i>
<i>Leucothoe racemosa.</i>	“ <i>rugosa.</i>
<i>Xolisma ligustrina.</i>	<i>Euthamia caroliniana.</i>
<i>Epigaea repens.</i>	<i>Sericocarpus asteroides.</i>
<i>Gaultheria procumbens.</i>	“ <i>linifolius.</i>
<i>Gaylussacia baccata.</i>	<i>Aster concolor.</i>
“ <i>frondosa.</i>	“ <i>patens.</i>
<i>Vaccinium vacillans.</i>	“ <i>undulatus.</i>
“ <i>atrococcum.</i>	“ <i>novi-belgii.</i>
<i>Lysimachia terrestris.</i>	<i>Ionactis linariifolius.</i>
<i>Trientalis borealis.</i>	<i>Gnaphalium obtusifolium.</i>
<i>Bartonia virginica.</i>	“ <i>purpureum.</i>
“ <i>paniculata.</i>	<i>Helianthus divaricatus.</i>
<i>Limnanthemum lacunosum.</i>	<i>Coreopsis rosea.</i>
<i>Asclepias amplexicaulis.</i>	

THE MIDDLE DISTRICT.

What I have termed the Middle District occupies that portion of the coastal plain which lies west and north of the Pine Barrens, reaching around the bay shore to Dennisville, although its sepa-

ration from the Cape May district is purely an arbitrary one. To the north it stretches up to the head of the Hackensack marshes, and includes Staten Island, part of Long Island, as well as a strip of eastern Pennsylvania lying east of the fall line, comprising a considerable section of Bucks County and Tinicum township, in Delaware County. The lower part of Philadelphia also belonged to this district, though its native flora is now practically exterminated.

This is the region referred to by Dr. Arthur Hollick in his interesting paper on "The Relation Between Forestry and Geology in New Jersey"* as the "Tension Zone," "because it is there that the two floras [*i. e.*, the deciduous forest of the northern uplands and the coniferous forest of the Pine Barrens] meet and overlap, producing a constant state of strain or tension in the struggle for advantage."

Dr. Hollick was admittedly drawing his conclusions mainly from a study of the northern edge of the Pine Barrens as seen in the "tongues" which cross a line from Monmouth Junction to Farmingdale, and was not in possession of detailed information on the distribution of species in the southern part of the State. He, therefore, missed the fact that the so-called "Tension Zone" is not merely a mixture of elements from the northern counties and the Pine Barrens, but is characterized by a large number of peculiar species which are as foreign to one of the above regions as they are to the other. Some of the trees which are peculiar to the Middle District as contrasted with the Northern Uplands and Pine Barrens are *Dospyros virginiana*, *Ilex opaca*, *Pinus virginiana*, *Quercus phellos*, *Betula nigra*, *Liquidambar styraciflua*. Dr. Hollick states that all of these occur in the Coniferous Zone, but, as a matter of fact, they are unknown in the Pine Barrens, though they re-occur on the coast strip and in the Cape May district. Therefore, while I heartily agree with Dr. Hollick's contention that "the mechanical structure of the soil" is the most potent factor in the distribution of plants, I fail to appreciate the importance of "tension" in the vegetation of this zone. To me it seems to be a division of the coastal plain of equal rank with the Pine Barrens.

* Report on Forests, Ann. Rep. State Geol. N. J. for 1899, pp. 177-201.

This Middle district is eminently an agricultural one and largely given over to truck farms, so that the original flora is exterminated over large areas. Bogs and swamps have been drained to a great extent and much forest land has disappeared. There are still, however, along the banks of creeks and streams and in other situations sufficient remnants to form a pretty accurate idea of the constituents of the flora.

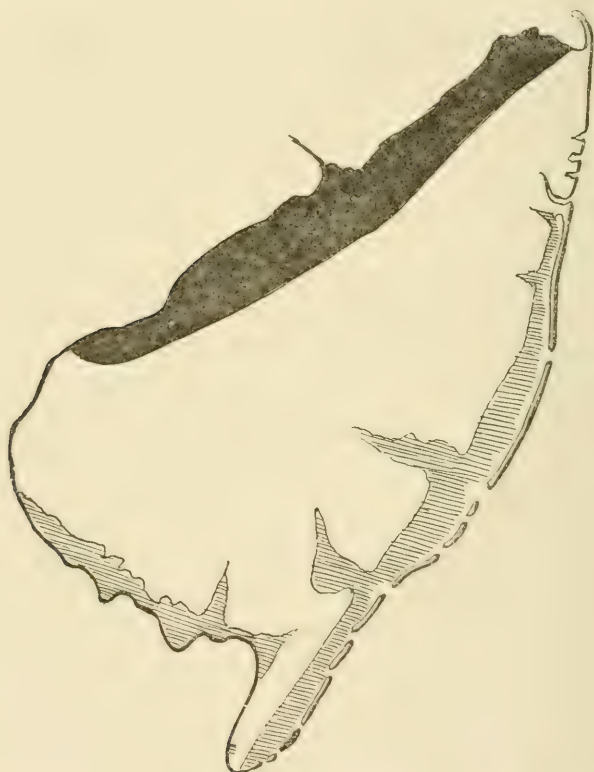


Fig. 4.—Range of *Erythronium americanum*, a species which enters the upper edge of the Middle District.

The region comprises all of the cretaceous formation, and part of the tertiary, as already explained, but peculiarities in distribution conform not to the boundaries of these areas, but rather to the areas of marl, sand or other varieties of surface soil.

Several elements or intrusions may be detected in this flora of the Middle district:

(1) Plants that have spread over from the country north of the fall line, most noticeable in the northwestern part of Burlington County and northern Monmouth County (Fig. 4).

(2) The isolated Pine Barren colonies or islands already referred to.

(3) Species which seem to have their center of abundance in the Cape May district or more properly in Delaware (Fig. 5).



Fig. 5.—Range of *Lobelia puberula*, a Cape May plant which pushes along the coast and Lower Middle District.

In the bogs at Delanco and Repaupo, close to the Delaware, and to a less extent in some of the others occur certain decidedly boreal species, which probably owe their presence here to some earlier phenomenon than the recent influx of upland species across the fall line. These occurrences are parallel with the presence of *Rhododendron* and *Ilicioides* in the swamps of the Pine Barrens.

Such species are *Muhlenbergia foliosa*, *Carex limosa*, *Eriophorum gracile*, *Scirpus torreyi*, *Schenckzeria palustris*, *Menyanthes trifoliatus*.

The district presents many varieties of vegetation. The tide-water creeks along the Delaware support *Zizania palustris*, *Typha latifolia*, *Typha angustifolia*, *Peltandra virginica*, *Sagittaria latifolia*, *Nymphaea advena*, *Polygonum sagittatum*, *P. arifolium*, *Bidens laevis*, *Cephalanthus occidentalis*, *Sambucus canadensis*, etc., etc.

In the swampy meadows characteristic species are *Eupatorium maculatum*, *E. perfoliatum*, *Solidago rugosa*, *Euthamia graminifolia*, *Mimulus ringens*, *Chelone glabra*, *Lobelia cardinalis*, *Vernonia noveboracensis*, *Aster novi-belgii*, *A. puniceus*, *Cuscuta gronovii*, *Galium asprellum*, *Alnus rugosa*, *Asclepias pulchra*, etc., etc.

Woodlands vary a great deal in composition. Near the Delaware in Camden County are some almost exclusively composed of beech, *Fagus grandifolia*, with which are associated *Quercus rubra* and *Q. alba*, with very little undergrowth and such herbs as *Leptamnium virginianum*, *Hypopitys hypopitys*, *Chimaphila maculata*, *Peramium pubescens* and *Mitchella repens*.

Pure beech woods, however, are rare, and the typical West Jersey woods, especially along the streams, consist of *Quercus phellos*, *Q. palustris*, *Q. triloba*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Fagus grandifolia*, *Corpinus caroliniana*, *Cornus florida*, *Betula nigra*, *Nyssa sylvatica*, *Hicoria alba*, *H. glabra*, *Prunus serotina*, *Diospyros virginiana*, with undergrowth of *Viburnum dentatum*, *Ilex opaca*, *Azalea nudiflora*, *Evonymus americanus*, etc.

In other spots more remote from water an almost pure growth of *Pinus virginiana* occurs, with huckleberries here and there and such herbs as *Cypripedium acaule*, *Silene caroliniana*, *Chimaphila maculata*, *C. umbellata*, *Pyrola rotundifolia*, *P. chlorantha*, *P. secunda*, *Asclepias amplexicaulis*, various species of *Panicum*, etc., etc.

In the bogs some Pine Barren species often occur, with such other species as *Polygala viridescens*, *Castilleja coccinea*, *Lobelia cardinalis*, *Gentiana crinita*, *Gentiana saponaria*, *Sanguisorba*

canadensis, *Caltha palustris*, etc., none of which occur in the Pines.

Numerically the flora of the Middle District comprises, exclusive of weeds, ...	1138
Obvious intrusions or "relicts" from the Pine Barrens or from other districts, ...	114
Plants common to the northern half of the State, but occurring only in the upper part of the Middle District, ...	655
	769
Characteristic Middle District Flora, ...	369

Systematically these are grouped as follows:

Pteridophytes, ...	8
Gymnosperms, ...	3
Monocotyledons Gramineæ, ...	39
Cyperaceæ, ...	33
Others, ...	40
	112
Dicotyledons Polypetalæ, ...	128
Monopetalæ, ...	118
	246
	369

Considering the entire Middle district flora, exclusive of the 114 intrusions, *i. e.* 1,023 species, we find the range of the species is as follows:

WIDE RANGING.

Whole of North America, ...	18
Canadian Provinces to Virginia-Florida, ...	353
Maine to Virginia-Florida, ...	258

NORTHERN ELEMENT.

Plants ranging south to	N. J.	Del. or Md.
From Labrador, ...	7	3
Newfoundland, ...	12	8
Nova Scotia, ...	8	8
New Brunswick, ...	2	2
Maine, ...	15	9
New Hampshire, ...	0	1
Vermont, ...	2	1
	46*	32

* For list of species, see pp. 49-56.

SOUTHERN ELEMENT.

Plants ranging north to	N. J.	So. N. Y.	Ct. or R. I.	Mass.
From Virginia, ...	3	3	2	11
N. Carolina, ...	2	4	1	6
S. Carolina, ...	2	3	3	4
Georgia, ...	9	7	7	19
Florida, ...	53	39	35	85
	69*	56	48	125

LOCAL ELEMENT.

New Jersey only, ...	3
New Jersey-Maryland, ...	2
Long Island-New Jersey, ...	1
Long Island-Delaware, ...	1
R. I.-Delaware, ...	1
Massachusetts to N. J., ...	1
" " Delaware, ...	4
" " Maryland, ...	5
	18

LIST OF CHARACTERISTIC MIDDLE DISTRICT PLANTS.

To the following 167 species are to be added the 202 common to the Pine Barrens (see p. 78):

<i>Lygodium palmatum.</i>	<i>Cyperus retrofractus.</i>
<i>Dryopteris thelypteris.</i>	" <i>hystricinus.</i>
<i>Equisetum arvense.</i>	<i>Carex lupulina.</i>
<i>Sorghastrum nutans.</i>	" <i>intumescens.</i>
<i>Juniperus virginiana.</i>	" <i>vestita.</i>
<i>Pinus virginiana.</i>	" <i>caroliniana.</i>
<i>Paspalum prostratum.</i>	" <i>triceps.</i>
<i>Panicum stipitatum.</i>	" <i>oblita.</i>
" <i>depauperatum.</i>	" <i>interior.</i>
" <i>dichotomum.</i>	" <i>varia emmonsii.</i>
" <i>microcarpon.</i>	" <i>vulpinoidea.</i>
" <i>barbulatum.</i>	" <i>scoparia.</i>
" <i>scribnerianum.</i>	<i>Arisæma triphyllum.</i>
<i>Stipa avenacea.</i>	" <i>pusillum.</i>
<i>Deschampsia flexuosa.</i>	<i>Peltandra virginica.</i>
<i>Gymnopogon ambiguus.</i>	<i>Spathyema fœtida.</i>
<i>Eragrostis pectinacea.</i>	<i>Juncus marginatus.</i>
<i>Panicularia nervata.</i>	" <i>scirpoides.</i>
" <i>pallida.</i>	<i>Uvularia sessilifolia.</i>

* For list of species, see pp. 49-56.

- Uvularia perfoliata*.
Polygonatum commutatum.
Medeola virginiana.
Dioscorea villosa.
Saururus cernuus.
Hicoria glabra.
Carpinus caroliniana.
Betula nigra.
Fagus grandifolia.
Castanea dentata.
Quercus rudkini.
 " *palustris*.
 " *phellos*.
 " *triloba*.
Morus rubra.
Comandra umbellata.
Rumex verticillatus.
Polygonum tenue.
 " *punctatum*.
 " *sagittatum*.
 " *arifolium*.
 " *scandens*.
Silene caroliniana.
Liriodendron tulipifera.
Aquilegia canadensis.
Anemone quinquefolia.
Clematis virginiana.
Ranunculus hispidus.
Thalictrum polygamum.
Benzoin aestivale.
Spiræa latifolia.
 " *tomentosa*.
Fragaria virginiana.
Potentilla canadensis.
Geum canadense.
Rosa carolina.
Prunus serotina.
Cassia nictitans.
Meibomia nudiflora.
 " *paniculata*.
Lespedeza nuttallii.
 " *virginica*.
 " *capitata*.
Falcata comosa.
Geranium maculatum.
 " *carolinianum*.
Polygala viridescens.
Rhus copallina.
 " *radicans*.
Ilex opaca.
 " *verticillata*.
Impatiens biflora.
Vitis labrusca.
 " *æstivalis*.
Psedera quinquefolia.
Hypericum mutilum.
Viola pedata.
 " *cucullata*.
 " *sagittata*.
 " *primulæfolia*.
 " *rafinesquii*.
Opuntia opuntia.
Onagra biennis.
Ænothera laciniata.
Kneiffia pumila.
Sanicula canadensis.
Cicuta maculata.
Sium cicutæfolium.
Angelica villosa.
Oxypolis rigidior.
Cornus florida.
 " *amomum*.
Pyrola rotundifolium.
Chimaphila maculata.
Monotropa uniflora.
Azalea nudiflora.
Lysimachia quadrifolia.
Diospyros virginiana.
Sabatia angularis.
Asclepias tuberosa.
 " *variegata*.
Convolvulus sepium.
Cuscuta gronovii.
Phlox maculata.
Myosotis virginica.
Verbena hastata.
Scutellaria lateriflora.
 " *integrifolia*.
Hedeoma pulegioides.
Koellia flexuosa.
Lycopus americanus.
Chelone glabra.
Mimulus ringens.
Dasystoma flava.
Gerardia tenuifolia.
Mitchella repens.
Galium aparine.
 " *claytoni*.

<i>Galium pilosum.</i>	<i>Aster puniceus.</i>
<i>Sambucus canadensis.</i>	“ <i>lateriflorus.</i>
<i>Viburnum dentatum.</i>	“ <i>ericoides.</i>
<i>Specularia perfoliata.</i>	<i>Dœllingeria umbellata.</i>
<i>Lobelia cardinalis.</i>	<i>Antennaria neodiocia.</i>
<i>Adopogon virginicum.</i>	“ <i>neglecta.</i>
<i>Lactuca canadensis.</i>	“ <i>plantaginifolia.</i>
<i>Vernonia noveboracensis.</i>	“ <i>parlinii.</i>
<i>Eupatorium maculatum.</i>	<i>Helianthus giganteus.</i>
“ <i>perfoliatum.</i>	<i>Bidens lævis.</i>
“ <i>aromaticum.</i>	“ <i>comosa.</i>
<i>Willugbæya scandens.</i>	“ <i>frondosa.</i>
<i>Solidago serotina.</i>	“ <i>bipinnata.</i>
“ <i>altissima.</i>	<i>Senecio aureus.</i>
“ <i>canadensis.</i>	<i>Carduus discolor.</i>
<i>Euthamia graminifolia.</i>	“ <i>muticus.</i>

THE COASTAL STRIP.

The existence of a coastal flora distinct from that of the Pine Barrens and independent of the maritime element was first recognized by the writer and pointed out in 1908.*

This is essentially a continuation of the flora of the Middle district around the northern and southern extremities of the Pine Barrens. North of Asbury Park it practically merges into the Middle district, while south of Sea Isle Junction it is not always clearly defined from similar elements of the Cape May district. On the coast islands from Bay Head to Sewell's Point, Cape May, it is well developed and contains, in addition to the Middle district species, a certain number of Pine Barren plants. The strip on the mainland is sometimes so narrow and so cut by projecting arms of the Pine Barrens that it is obviously impossible to tell which species of the latter should be regarded as common also to the coastal strip. The only plan seems to be to include only such as have become established on the islands. While the coastal flora has been said to be largely identical with that of the Middle

* Proc. Acad. Nat. Sci., Phila., 1907, p. 452 (issued Jan. 20, 1908). This strip appears in Prof. John B. Smith's report on New Jersey Insects in last year's Museum Report. Prof. Smith consulted with me upon the construction of this map and availed himself of the results of my studies upon the distribution of plants and vertebrate animals in New Jersey, but inadvertently failed to mention the fact or to refer to the paper just quoted.

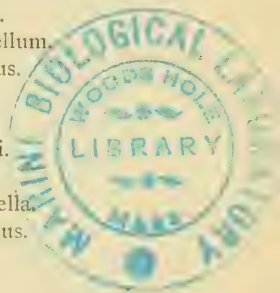
district, there is an additional element of a distinctly boreal nature found neither in the Middle district nor in the Pine Barrens.* Such species are starred in the following list, the other species being plants of similar boreal distribution, but which occur also occasionally in the upper part of the Middle district, although much more abundant on the coast.

Ophioglossum vulgatum.
Lycopodium flabelliforme.
Potamogeton pectinatus.*
Cinna arundinacea.
Bromus purgans.*
Elymus striatus.
Cyperus diandrus.
Carex lanuginosa.
Juncus articulatus.*
Vagnera stellata.*
Unifolium canadense.
Leptorchis loeselii.
Gyrostachys plantaginea.
Populus tremuloides.
Morus rubra.
Parietaria pennsylvanica.*
Silene stellata.
Sagina procumbens.*
Moehringia lateriflora.
Aquilegia canadensis.
Arabis lyrata.

Fragaria virginica.
Sanguisorba canadensis.
Rosa virginiana.*
Crataegus crus-galli.
Falcata comosa.
Phaseolus polystachyus.
Geranium robertianum.*
Polygala verticillata.
Celastrus scandens.
Hypericum boreale.
Myriophyllum tenellum.
Samolus floribundus.
Sabatia angularis.
Gentiana crinita.
Gentiana andrewsii.
Lycopus uniflorus.
Scrophularia leporella.
Helianthus giganteus.
Carduus discolor.
 " *muticus*.

The coast islands form a most interesting field for botanical study, but unfortunately the spread of seaside resorts has cleared one beach after another of its native flora until there is practically no untouched forest except the tract back of Ventnor and south of Atlantic City. This contains numbers of Pitch Pine *Pinus rigida*, as well as Red Cedar *Juniperus virginiana*, White Oak *Quercus alba*, Post Oak *Q. stellata*, Spanish Oak *Q. triloba*, Shadbush *Amelanchier intermedia*, Wild Cherry *Prunus scrotina*, Sumac *Rhus copalina*, Red Maple *Acer rubum*, Grape *Vitis æsti-*

* Dr. H. A. Pilsbry has found a precisely similar element in the Land Snail fauna of the coast strip in the woods below Atlantic City. Cf. *The Nautilus*, 1911, pp. 34-35.



alis, Holly *Ilex opaca*, Staff Vine *Celastrus scandens*, Sassafras *S. sassafras*, and Persimmon *Diospyrus virginiana*. To the north the island beaches support no trees except a few Red Cedars, though the spit reaching from Bay Head southward contains *Quercus phellos*, *Ilex opaca*, *Quercus ilicifolia*, *Pinus rigida*. To the south there was until two years ago, quite a wooded thicket at the upper end of Ocean City, comprising the same species as those found near Ventnor, except the Pine.

Sea Isle Beach supported only a few Cedars, as did Two-Mile Beach, just above Cape May, but the two intervening islands, Seven and Five-Mile Beaches, were thickly wooded. Pines were very rare, two small ones only, on Seven-Mile and no record for Five-Mile. The abundant species were the same as those found back of Ventnor on the Atlantic City Island, with the addition of Willow Oak *Quercus phellos*, Red Mulberry *Morus rubra*, Hackberry *Celtis occidentalis* and *Magnolia virginiana* on Seven-Mile Beach, and most of them on Five-Mile Beach as well.

On Seven-Mile Beach immense sand dunes (see pl. CXXIX), towering higher than the forest, shut it off from the sea, but my last visit there found a gang of men cutting down the forest, while steam shovels were leveling the dunes, and dirt cars carried off the sand to be used in the manufacture of concrete houses. Five-Mile Beach has suffered similar "improvement."

Fortunately good series of the flora of these two islands, now all but extinct, are preserved in the Academy of Natural Sciences and University of Pennsylvania, while Dr. Thos. S. Githens, Prof. Chas. H. LaWall* and the writer have made considerable collections at Ventnor. An "Ecological Study of the New Jersey Strand Flora," presented by Dr. J. W. Harshberger in the Proceedings of the Philadelphia Academy, 1900, p. 623, contains a good account of the forest of Five-Mile Beach.

A list of the plants peculiar to the coast strip follows. A few of them occur occasionally in the Middle district, but they are far more abundant on the coast. These are additional to those starred in the preceding list on p. 89, and a number of them are of austral affinities.

* Cf. Barton, 1910, pp. 12-21.

<i>Tripsacum dactyloides</i> .	<i>Atriplex hastata</i> .
<i>Erianthus saccharoides</i> .	<i>Cardamine arenicola</i> .
<i>Panicum virgatum</i> .	<i>Bradburya virginiana</i> .
“ <i>oricola</i> .	<i>Kosteletzkyia virginica</i> .
“ <i>linearifolium</i> .	<i>Hudsonia tomentosa</i> .
“ <i>scoparium</i> .	<i>Lechea maritima</i> .
“ <i>mattamusketense</i> .	<i>Ludwigiantha arcuata</i> .
“ <i>lanuginosum</i> .	<i>Hydrocotyle verticillata</i> .
<i>Spenopholis obtusata</i> .	<i>Convolvulus repens</i> .
<i>Cyperus grayi</i> .	<i>Lippia lanceolata</i> .
“ <i>microdontus</i> .	<i>Koellia aristata</i> .
<i>Scleria verticillata</i> .	<i>Baccharis halimifolia</i> .
<i>Myrica carolinensis</i> .	

The following list comprises some of the species characteristic of the Coast strip as contrasted with the Pine Barrens, but which are also common in West Jersey:

<i>Juniperus virginiana</i> .	<i>Oenothera biennis</i> .
<i>Panicum huachucae</i> .	<i>Proserpinaca palustris</i> .
<i>Tridens flavus</i> .	<i>Sium cicutifolium</i> .
<i>Elymus virginicus</i> .	<i>Oxypolus rigidior</i> .
<i>Cyperus rivularis</i> .	<i>Cornus florida</i> .
<i>Carex tenuis</i> .	<i>Sabatia angularis</i> .
<i>Vagnera racemosa</i> .	<i>Asclepias pulchra</i> .
<i>Quercus phellos</i> .	<i>Verbena hastata</i> .
<i>Celtis occidentalis</i> .	<i>Salvia lyrata</i> .
<i>Polygonum scandens</i> .	<i>Lycopus americanus</i> .
“ <i>punctatum</i> .	<i>Gerardia purpurea</i> .
<i>Benzoin aestivale</i> .	<i>Galium claytoni</i> .
<i>Liquidambar styraciflua</i> .	<i>Sambucus canadensis</i> .
<i>Geum canadense</i> .	<i>Viburnum dentatum</i> .
<i>Rosa carolina</i> .	<i>Lobelia cardinalis</i> .
<i>Strophostyles helvula</i> .	<i>Vernonia noveboracensis</i> .
<i>Ilex opaca</i> .	<i>Eupatorium maculatum</i> .
<i>Impatiens biflora</i> .	“ <i>perfoliatum</i> .
<i>Vitis labrusca</i> .	<i>Solidago altissima</i> .
<i>Hibiscus moscheutos</i> .	<i>Helenium autumnale</i> .
<i>Hypericum mutilum</i> .	<i>Carduus spinosissimus</i> .
<i>Opuntia opuntia</i> .	

The coast strip flora, exclusive of the halophytes of the strand and salt marshes, comprises 524 species
Of these there are local intrusions from other districts, ... 32

True coast strip flora, ... 492

These range as follows:

WIDE RANGING.

Throughout North America, ...	12
Canadian Provinces to Virginia-Florida, ...	156
Maine-N. Hampshire to Virginia-Florida, ...	134

NORTHERN ELEMENT.

Plants ranging south to	N. J.	Del. or Md.
From Labrador, ...	1	0
Newfoundland, ...	10	1
New Brunswick, ...	1	2
Nova Scotia, ...	1	2
Maine, ...	2	6
	15	11

SOUTHERN ELEMENT.

Plants ranging north to	N. J.	So. N. Y.	Ct. or R. I.	Mass.
From Virginia, ...	1	0	1	5
N. Carolina, ...	1	1	1	5
S. Carolina, ...	1	0	0	3
Georgia, ...	1	1	2	8
Florida, ...	28	27	20	52
	32	29	24	73

LOCAL ELEMENT.

New Jersey only, ...	2
Long Island to New Jersey, ...	1
Mass. to New Jersey, ...	1
Mass. to Delaware, ...	1
Mass. to Maryland, ...	1
	6

THE CAPE MAY DISTRICT.*

The Cape May peninsula south of the Great Cedar Swamp, stretching from Dennisville to Sea Isle Junction, is for convenience regarded as a separate district. As a matter of fact, it consists of a joining of the coast strip flora and that of the Middle District, which comes around the bay shore from the west. The Pine Barren element is also present, but in more or less isolated patches and dilute in character.

Pine woods are comparatively scarce, and occur mainly on the

* Cf. "Scheyichbi and the Strand," Edw. S. Wheeler, 1876, for account of the Cape May District.

western side of the peninsula, while even there we find nothing like the open pitch pine woods of the Pine Barrens.

The country is largely cultivated along the coast and in the lower portion of the peninsula, but the native flora is nowhere destroyed as in the marl belt of the Middle District.

An interesting feature of the flora of the peninsula is the recurrence of many upland species, especially about Cold Spring and Bennett, which are rare or absent between this point and the northern portion of the Middle district in Burlington and Monmouth Counties, also the presence of certain other northern species not known elsewhere south of the fall line.

Such species are as follows:

<i>Botrychium virginicum.</i>	<i>Heuchera americana.</i>
<i>Calamagrostis canadensis.</i>	<i>Geum canadensis.</i>
<i>Sphenopholis palustris.</i>	<i>Agrimonia mollis.</i>
<i>Poa brevifolia.</i>	<i>Cassia marilandica.</i>
<i>Panicularia septentrionalis.</i>	<i>Meibomia nudiflora.</i>
<i>Carex buxbaumii.</i>	<i>Oxalis violacea.</i>
“ <i>festucea brevior.</i>	<i>Linum virginianum.</i>
<i>Arisaema dracontium.</i>	<i>Sanicula marilandica.</i>
<i>Veratrum viride.</i>	<i>Angelica villosa.</i>
<i>Uvularia perfoliata.</i>	<i>Cornus florida.</i>
<i>Allium canadense.</i>	<i>Fraxinus pennsylvanica.</i>
<i>Blephariglottis lacera.</i>	<i>Menyanthes trifoliata.</i>
<i>Corallorhiza odontorhiza.</i>	<i>Phlox maculata.</i>
<i>Peramium pubescens.</i>	<i>Scutellaria pilosa.</i>
<i>Carpinus caroliniana.</i>	“ <i>galericulata.</i>
<i>Betula nigra.</i>	<i>Koellia flexuosa.</i>
<i>Fagus grandifolia.</i>	<i>Cunila origanoides.</i>
<i>Quercus rubra.</i>	<i>Chelone glabra.</i>
<i>Aristolochia serpentaria.</i>	<i>Pedicularis lanceolata.</i>
<i>Polygonum virginianum.</i>	<i>Pedicularis canadensis.</i>
<i>Liriodendron tulipifera.</i>	<i>Galium circaezans.</i>
<i>Cimicifuga racemosa.</i>	<i>Viburnum prunifolium.</i>
<i>Anemone virginiana.</i>	<i>Triosteum perfoliatum.</i>
<i>Clematis virginiana.</i>	<i>Campanula aparinoides.</i>
<i>Ranunculus hispidus.</i>	<i>Adopogon virginicum.</i>
<i>Thalictrum revolutum.</i>	<i>Lactuca spicata.</i>
<i>Menispermum canadense.</i>	<i>Aster macrophyllus.</i>
<i>Sanguinaria canadensis.</i>	<i>Erigeron pulchellus.</i>
<i>Saxifraga pennsylvanica.</i>	<i>Senecio aureus.</i>
<i>Saxifraga virginiana.</i>	

In contrast to this is a certain southern element especially noticeable to the west of Bennett and Cold Spring, but spread

more or less over the whole lower third of the peninsula. Most of these species are restricted to the Cape May District, but a few have spread northward in the lower Middle District, and constitute the "Cape May element" referred to under that head—*i. e.*, *Pinus scrotina*, *Paspalum membranaceum*, *Aristida lanosa*, *Gymnopogon brevifolius*, *Elcocharis tortilis*, *Hypericum adpressum*, *Gratiola sphaerocarpa*, *Lobelia puberula*. In the same category should probably be placed *Cyperus pseudovegetus*, *Polygala incarnata*, and a few other species rare in the Middle District and not yet detected on the Cape May peninsula.

A few of the Cape May plants also spread northward along the coast strip for a short distance.

All of the plants peculiar to Cape May, which are of southern affinities, are found immediately across the bay in Delaware, where the flora is practically the same.*

The Cape May flora numbers in all 658 species; of these there may be deducted as local intrusions 8, leaving 650 species.

None of the Pine Barren species have been deducted, since they vary so in their abundance in the Cape May district that it is impossible to say which should be regarded as true members of the flora and which as intrusions or relicts.

Considering the general range of the species, they fall into the following categories:

WIDE RANGING.

Throughout North America, ...	13
Canadian Provinces to Virginia-Florida, ...	182
Maine to Virginia-Florida, ...	164

NORTHERN ELEMENT.

Ranging south to	N. J.	Del. or Md.
From Newfoundland, ...	5	3
New Brunswick, ...	2	0
Nova Scotia, ...	0	2
Maine, ...	1	2
New Hampshire, ...	1	0
	9	7

* Cf. Williamson *Torrey*, 1909, p. 160, and Harper *Torrey*, 1909, p. 217, for notes on the Delaware flora and Shreve et al. *Plant Life of Maryland* (vol. 3, publ. Md. Weather Service, 1910) for account of that of Maryland.

SOUTHERN ELEMENT.

Plants ranging north to	N. J.	So. N. Y.	Ct. or R. I.	Mass.
From Virginia, ...	1	2	1	6
N. Carolina, ...	2	1	1	7
S. Carolina, ...	2	0	3	2
Georgia, ...	6	2	5	8
Florida, ...	73	48	26	67
	84	53	36	90

LOCAL ELEMENT.

New Jersey only, ...	I
New Jersey to Maryland, ...	I
Long Island to New Jersey, ...	3
Mass. to Del. or Md., ...	6
	II

Species Peculiar to the Cape May District, or Spreading Slightly Northward in the Middle or Coast Districts.

<i>Pinus tæda.</i>	<i>Eleocharis melanocarpa.</i>
“ <i>serotina.</i>	“ <i>tortilis.</i>
<i>Taxodium distychnum.</i>	<i>Psilocarya nitens.</i>
<i>Coelorachis rugosa.</i>	<i>Rhynchospora macrostachya.</i>
<i>Paspalum membranaceum.</i>	“ <i>rariflora.</i>
“ <i>plenipilum.</i>	(<i>Carex buxbaumii</i>).*
“ <i>glabratum.</i>	(“ <i>festucea brevior</i>).*
<i>Panicum hemitomon.</i>	<i>Xyris elata.</i>
“ <i>condensum.</i>	<i>Juncus setaceus.</i>
“ <i>commutatum.</i>	<i>Gymnadeniopsis nivea.</i>
“ <i>angustifolium.</i>	<i>Blephariglottis peramoena.</i>
“ <i>aciculare.</i>	<i>Tipularia discolor.</i>
“ <i>caerulescens.</i>	<i>Myrica cerifera.</i>
“ <i>wrightianum.</i>	<i>Polygonum eciliatum.</i>
<i>Sacciolepis striata.</i>	“ <i>setaceum.</i>
<i>Chaetochloa magna.</i>	<i>Lespedeza stuevei neglecta.</i>
<i>Aristida lanosa.</i>	<i>Galactia volubilis.</i>
<i>Sporobolus asper.</i>	<i>Falcata pitcheri.</i>
<i>Gymnopogon brevifolius.</i>	<i>Malus angustifolia.</i>
<i>Poa brachyphylla.</i>	<i>Hypericum adpressum.</i>
<i>Eleocharis quadrangulata.</i>	<i>Hottonia inflata.</i>
“ <i>ocreata.</i>	(<i>Menyanthes trifoliata</i>).*

* Peculiar to the Cape May District so far as southern New Jersey is concerned, but of distinctly boreal affinities. *Poa brachyphylla* and *Panicum commutatum* occur farther north in Pennsylvania, etc., and are not quite in the same class with the other species here listed, but their affinities are austral.

<i>Lycopus rubellus.</i>	<i>Plantago elongata.</i>
<i>Gratiola pilosa.</i>	<i>Diodia virginiana.</i>
" <i>sphaerocarpa.</i>	<i>Galium hispidulum.</i>
<i>Utricularia radiata.</i>	<i>Eupatorium cœlestinum.</i>
" <i>juncea.</i>	<i>Solidago elliotii.</i>
" <i>resupinata.</i>	<i>Boltonia asteroides.</i>
<i>Tecoma radicans.</i>	<i>Pluchea foetida.</i>
<i>Ruellia ciliosa.</i>	<i>Senecio tomentosus.</i>

THE MARITIME FLORA.

It is by no means as easy as would appear at first thought to separate the truly maritime plants, the halophytes of the strand and the salt marsh from plants of the coastal strip which occur along the edge of the salt marsh where it joins the upland or interior flora. Furthermore, some plants of the latter group, while strictly coastal in New Jersey, do not seem to be so elsewhere.

The main divisions of the maritime district are easily recognized: (1) the beach, (2) the sand dunes, and (3) the salt marsh.*

On the beach we have:

<i>Polygonum maritimum.</i>	<i>Sesuvium maritimum.</i>
<i>Atriplex arenaria.</i>	<i>Ammodenia peploides.</i>
<i>Salsola kali.</i>	<i>Cakile edentula.</i>
<i>Amaranthus pumilus.</i>	<i>Xanthium echinatum.</i>

Also often individuals of *Cenchrus*, *Ammophila*, *Carex*, *Oenothera* and *Euphorbia* from the dunes.

On the dunes occur:

<i>Panicum amarum.</i>	<i>Chenopodium leptophyllum.</i>
<i>Andropogon littoralis.</i>	<i>Lathyrus maritimus.</i>
<i>Cenchrus tribuloides.</i>	* <i>Prunus maritima.</i>
<i>Ammophila arenaria.</i>	<i>Euphorbia polygonifolia.</i>
<i>Eragrostis pectinacea spectabilis.</i>	<i>Hudsonia tomentosa.</i>
* <i>Cyperus grayi.</i>	<i>Lechea maritima.</i>
<i>Carex silicia.</i>	* <i>Polygonella articulata.</i>
<i>Rumex hastatulus.</i>	<i>Oenothera humifusa.</i>

*For more minute divisions cf. Harshberger, Proc. Acad. Nat. Sci. Phila. 1900, 623 et seq., 1902, 642-669.

A star before a name indicates that the species is not truly or exclusively maritime and has already been discussed in another category.

Also *Xanthium* from the beach and *Pseodera quinquefolia* and other interior plants.

Both the *Prunus* and *Polygonella* occur commonly in the Middle and Pine Barren districts, while the *Hudsonia* and *Lechea* are occasional in the Pines.

The true salt marsh vegetation consists of the following species :

Triglochin maritimum.	Salicornia ambigua.
Spartina cynosuroides.	Dondia americana.
“ patens.	“ linearis.
“ glabra.	Bassia hirsuta.
Diplachne fascicularis.	*Acnida cannabina.
Puccinellia fasciculata.	Tissa oligosperma.
Distichlis spicata.	Oxygraphis cymbalaria.
Cyperus nuttallii.	*Kosteletzkya virginica.
Eleocharis rostellata.	Glaux maritima.
Fimbristylis castanea.	Lilaeopsis linearis.
Scirpus americanus.	Sabatia stellaris.
“ nanus.	Gerardia maritima.
“ robustus.	Plantago decipiens.
Juncus gerardi.	“ halophila.
Polygonum proliferum.	Solidago sempervirens.
“ atlanticum.	Aster tenuifolius.
Chenopodium rubrum.	“ subulatus.
Atriplex hastata.	Iva oraria.
Salicornia europæa.	Baccharis halimifolia.
“ bigelovii.	Pluchea camphorata.

Of these *Spartina patens*, *Distichlis spicata*, *Juncus gerardi*, *Salicornia europæa*, *S. bigelovii* and *S. ambigua* make up the bulk of the vegetation on the open marsh, more sandy spots support *Cyperus nuttallii*, *Plantago maritima*, *Dondia linearis*, *D. americana*, *Bassia hirsuta*, *Polygonum atlanticum*, *P. proliferum*, etc., while along the edges of the creeks and thoroughfares which occur everywhere through the marshes grow *Spartina cynosuroides*, *Iva oraria* and *Baccharis halimifolia*.

Solidago sempervirens and *Atriplex hastata* occur in almost any situation except out on the open flat marsh.

Some of these plants, notably *Sabatia stellaris* and *Kosteletzkya virginica*, grow along the border of the “upland”, and belong better, perhaps, with the following, which are usually associated with them :

<i>Chaetochloa magna.</i>	* <i>Lythrum lineare.</i>
* <i>Chaetochloa versicolor.</i>	<i>Eryngium aquaticum.</i>
<i>Echinochloa walteri.</i>	* <i>Sabatia dodecandra.</i>
* <i>Festuca rubra.</i>	* <i>Asclepias lanceolata.</i>
<i>Elymus halophilus.</i>	* <i>Teucrium canadense littorale.</i>
<i>Fuirena squarrosa.</i>	<i>Ptilimnium capillaceum.</i>
“ <i>hispida.</i>	

Some of both of the last lists also occur in the moist hollows among the dunes, where we also find:

* <i>Samolus floribundus.</i>	* <i>Agrostis maritima.</i>
* <i>Limosella tenuifolia.</i>	* <i>Sphenopholis obtusata.</i>
* <i>Zanichellia palustris.</i>	* <i>S. obtusata pubescens.</i>

While the species in the last three lists are typical coast plants, some of them occur also in other districts, and some are, perhaps, better referred to the coastal strip already described than to the maritime.

In salt water along the coast we find *Zostera marina* and *Ruppia maritima*, the latter extending into brackish or even fresh ponds, and where larger streams come down to the coast or where extensive fresh marshes join the brackish ones we find *Scirpus olneyi*, *Typha angustifolia*, *T. latifolia* and *Phragmites phragmites*.

Of the eighty-nine species referred to in this discussion of the maritime flora eighteen have been considered under other sections in the preceding discussions and estimates, though, as already said, the division is sometimes an arbitrary one. These species have been starred to distinguish them from those regarded as truly maritime.

When the 71 maritime species are grouped according to their general range we find them divided as follows:

WIDE RANGING.

Canadian Provinces to Virginia-Florida, ...	21
Maine to Virginia-Florida, ...	10
Maine to Delaware, ...	1

NORTHERN ELEMENT.

Ranging south to	N. J.
From Labrador, ...	3
Newfoundland, ...	4
Nova Scotia, ...	4
Maine, ...	2
	13

SOUTHERN ELEMENT.

Plants ranging north to	N. J.	So. N. Y.	Ct. or R. I.	Mass.
From N. Carolina, ...	0	0	1	0
Georgia, ...	0	0	1	0
Florida, ...	4	3	3	13
	4	3	5	13

LOCAL ELEMENT.

Massachusetts to Maryland, ...	1
New Jersey only, ...	1

WEEDS AND ADVENTIVE VEGETATION.

Important as is the study of weeds from an economic or ecologic standpoint, they have little or no significance in a geographic discussion of plant life, their principal function being to aid in obliterating all trace of the original range of the native vegetation.

In the Middle district the woodland, the beds of tide-water creeks and an occasional undrained bog are all that remain of the original vegetation. All the cultivated and waste ground is given over to weeds or introduced plants.

In the Pine Barrens, however, the great bulk of the ground is still occupied by the native flora, and weeds creep in only where settlements have been established and even then not as abundantly as in the Middle district.

It seems as if artificial interference with the native flora was necessary to the establishment and maintenance of weeds. So soon as the ground is cleared and the sod turned, weeds appear, though previously they were unable to gain a foothold. Traffic along the roads of the Pine Barrens must bring many weed

seeds into the heart of the region, but they seldom establish themselves except when cultivated tracts give them the opportunity. Even along the railroads they seldom spread beyond the artificial road-bed, and when broad, close-cropped clearings are maintained on each side of the track as a guard against fire, and weeds do become established there, they are soon exterminated when the native vegetation is allowed to assume a normal growth.

Cultivation not only opens the way for the introduction of foreign plants brought unintentionally by man to whatever country he goes, just like the various animal pests, but it tends to develop weeds out of a portion of the native vegetation. Most native plants are exterminated immediately or in a short time after cultivation, but others seem to find ideal conditions in the altered environment and become quite as much weeds as the foreign introductions. Such species as *Polygonum pennsylvanicum*, *P. aviculare*, *Erigeron annuus*, *E. ramosus*, *Leptilon canadense*, *Oenothera biennis*, *Lobelia inflata*, *Ambrosia artemisiifolia*, *Tridens flavus*, etc., etc., are known to be native, but all trace of their original range has been lost.

In New Jersey certain species native of the Middle district have become weeds, notably *Linaria canadensis*, *Oenothera sinuata*, *Monarda punctata*, etc., and these plants seem to take hold in the Pine Barren clearings more abundantly than the foreign weeds.

In the Pine Barren bogs the flooding incidental to cranberry growing is quite as detrimental to the native flora as the clearing and plowing of the forest. Many of the orchids, *Abama*, *Tofieldia*, and other bog species are exterminated, but curiously enough *Gyroltheca tinctoria* becomes a most troublesome weed, increasing enormously in all cultivated bogs where it may be present, and *Amphicarpon amphicarpon* swarms over the recently erected sand dykes like a veritable weed of long standing.

Dr. Arthur Hollick has spoken of the Middle district as the "Tension Belt," but it seems to me the real tension belt is in cleared areas in the Pine Barrens where native and introduced weeds and certain Middle district plants have managed to get a foothold and maintain themselves as long as cultivation continues. When this ceases then the native flora asserts itself and seems generally able to re-establish its supremacy and extermini-

nate the intruders. Native weeds seem to gain the ascendancy over the foreign ones, and then the forest and underbrush gradually returns.

In old fields grown up to *Andropogon* grass young pines develop rapidly along with sassafras, followed by various smaller shrubs and herbs. In more arid sections we often find traces of a clearing with a depression marking the location of a house all covered with a growth of sand blackberry, *Rubus cuneifolius*, or sweet fern, *Comptonia asplenifolia*.

Where cedar swamps have been cut or burned over there often develops immediately an abundance of cattail, *Typha latifolia*; wool grass, *Scirpus eriophorum*, some distinctly Middle district species and often *Phragmites*, but soon the magnolia and alder send up new shoots, quantities of chain ferns, *Woodwardia virginica* appear, and later young cedars begin to grow, and eventually the intruders are exterminated.

In West Jersey (Middle District) cultivation is seldom allowed to make a retrograde movement, and settlements are seldom abandoned as they have been among the pines. In certain cases, however, I have seen examples of reforestation here just as in the Pine Barrens, only that the sweet gum is the invading pioneer instead of the pitch pine. There is no evidence of invasion of the Middle District by the Pine Barren element as suggested by Dr. Hollick, the tendency being all the other way, though, as already explained, only made possible by the agency of man. The Middle District flora long ago occupied all land where surface soil conditions were favorable right up to the Pine Barren boundary and advances to-day only where those conditions are extended artificially into the pines.

In extensive Pine Barren settlements of long standing, as Vine-land, Landisville, Hammonton, etc., a good many native plants of the Middle district have followed the weeds and become established where richer soil has been developed, and, while they are listed in the following pages, the fact of their origin should be borne in mind, and their presence at these stations should not be regarded as evidence that these species were originally found in the Pine Barrens.

ORIGIN AND RELATIONSHIP OF THE COASTAL PLAIN FLORA OF
NEW JERSEY.

The aim of the present work is to present facts rather than to advance theories, as it is the opinion of the writer that deductions as to the origin and relationship of our flora can be more accurately drawn when we have carefully prepared lists covering the more southern sections of the coastal plain, for comparison. Certain ideas, however, have suggested themselves as the collection of data has progressed, which it may not be out of place to present.

In the first place, in regard to the distribution of plants in general, the writer was under the impression that plants were subject to so many irregularities that, except the trees and some shrubs, they did not accord very satisfactorily with the life zones as based upon the distribution of birds and mammals. This idea, however, proves to be wrong, as, with the exception of weeds, plants, down to the smaller herbs, seem to accord with remarkable accuracy to natural zones and areas, where the influence of man has not disturbed nature's equilibrium. We find certain species following the austral zones in the east up to the northern extremity of the coastal plain and pushing up the Mississippi valley, just as do the birds and mammals. This point is entirely lost in the brief statements of range given in the manuals. A plant of austral affinities may have a range similar to the above, reaching Massachusetts and Minnesota at the northernmost points of its range in the east and west respectively. The manuals will give its distribution as Massachusetts to Minnesota south to Florida, although it is absent from nearly half of that area, and in Pennsylvania, for instance, occurs only in the Delaware and Ohio valleys at the eastern and western extremities of the State. The meagreness of accurate data of this sort is a serious hindrance to the study of the geographic distribution of our plants.

The irregularities in the distribution of plants—that is to say, the departure from the boundaries of the life zones, is apparently largely due to the local nature of a plant as opposed to the free-ranging animal. Seeds washed down a river may germinate far

south of the true habitat of their species, and the immediate spot may be such as to enable the young plant to persist for a few years or a few generations, though it eventually perishes. So, too, when a species of plant is practically exterminated, local colonies will persist in spots where the immediate environment is suitable for their existence, while similar colonies of mammals require a very much larger area of congenial environment to prevent extermination.

Two lines of investigation are often confused in the study of geographic distribution: *i. e.* (1) the study of present day distribution and the mapping of existing life zones and life areas, and (2) the source of the species that make up the fauna and flora of a zone or area and the centers of dispersal from which they have spread.

Dr. Spencer Trotter* has pointed out that a zoögeographic (or phytogeographic) map shows only a transitory condition, and that the boundaries of zones and the ranges of species are always changing, the rate of change corresponding with the rate of physical or climatic change which the earth's surface may be undergoing.

Now, in studying plant distribution it seems to me we are constantly coming upon facts that bear upon conditions previous to those now existing; the local nature of the plant making such cases much more numerous than those that we find among vertebrate animals. And most of the apparent irregularities of plant distribution—isolated colonies, etc.—may safely be regarded as remnants of a former range of the species at a time when different conditions prevailed.

I might say here, as will be further explained beyond, that I do not consider that the mere presence of similar soil conditions at two remote localities is in itself sufficient to account for a certain resemblance in the floras of the two spots. There have probably been physical or climatic changes which have brought the plants to both these and other regions at some previous time, and they have persisted where soil conditions remained congenial, and disappeared and been superseded by other plants where conditions were not suited to their needs.

* Auk, 1909, pp. 231-233.

To argue that the same plants will appear wherever suitable soil conditions are present implies that the seeds of all plants are constantly being scattered broadcast, which is certainly not the case, or we should have no trace of the very evident agreement between plant distribution and climatic life zones.

The matter of seed distribution by birds has, I think, been greatly exaggerated, and I doubt if birds exert any appreciable influence upon plant distribution except in cultivated areas.

Robins, for instance, devour vast numbers of wild cherries in western New Jersey and along the coast, and must scatter the seeds far and wide. The birds are frequent over the Pine Barrens, and must scatter cherry stones there as well as elsewhere, and yet the wild cherry is unknown there except in a few isolated cases in cultivated spots. On the untouched floor of the sandy pine woods the cherry stones fail to germinate or to take root, but once the ground is cleared and the soil is turned by the plow conditions are changed.

Turning now to the consideration of the coastal plain flora of New Jersey, we realize that many plants of the more elevated country to the north and west have spread southward and eastward into the coastal plain, mainly along its western border, wherever soil conditions were favorable for their support, and have replaced or mingled with the more austral flora that probably originally covered the whole of southern New Jersey, so that in certain sections this element furnishes a considerable portion of the total plant life.

As has already been stated, there is also to be found in the Piedmont region an element of the more southern flora of the coastal plain, though not so great in extent as that which this region contributes to the coastal plain. Whether these plants have spread westward from below the fall line or whether they are remnants of a similar flora to that which now covers the coastal plain, and which has been all but superseded in the Piedmont region by the more advanced flora now found there, is a question hard to solve.

Two main causes seem to be active in governing the distribution of plants—*i. e.*, climate and soil conditions. Climate, we may say, determines what species are able to exist in a certain

belt or region, while soil conditions determine their distribution within that belt. Changes in condition of either climate or soil cause changes in the distribution of plants, and, consequently, extensions or contractions of their ranges in different directions. As already explained, we have many southern plants which we often refer to as pushing northward in the coastal plain, and others of northern affinities which find their southern limit in the New Jersey Pine Barrens, these we refer to as stragglers from the north. Often both elements occur side by side in the same spot, like *Schizaea pusilla** and *Lycopodium carolinianum*, which are here such constant and noteworthy associates.

It is a nice point to determine whether ranges are being extended in the same area at the same time in opposite directions or whether there has been a series of successive movements first in one direction and then in another, which have resulted in the present complex associations.

It seems most likely that changes of range due to climate have been of the latter character, and that many isolated boreal plants, such as *Rhododendron*, *Schizaea*, *Arctostaphylos*, *Corema* of the Pine Barrens, *Geranium robertianum*, *Vagnera stellata*, *Carex burbaumii*, *Menyanthes* and *Scheuchzeria* of other parts of southern New Jersey, may be relics of glacial times, while plants of distinctly austral affinities found far north of their normal range may be remnants of a southern flora that pushed northward when a milder climate prevailed.

Changes due to soil conditions, however, might easily take place in opposite directions simultaneously. The gradual enrichment of the sandy soil in various parts of the New Jersey coastal plain might readily coax southern species farther and farther north and northern species southward so long as climatic conditions were not prohibitive to their advance, while sand-loving plants originally brought to the same general region from different directions through successive climatic changes would be drawn into closer association where arid conditions were most intense.

* Prof. Fernald (Rhodora 1911, p. 109) seems to regard *Schizaea* and *Corema* as coastal plain plants which have pushed northward, while I have always regarded them as boreal species driven south to New Jersey.

Some such action as the former of these two examples seems clearly to be under way, for, as has been shown, the New Jersey Pine Barrens are at present surrounded by a more advanced flora which is pushing in from all sides wherever conditions are favorable, and man is rendering no small assistance in the movement. Both east and west of the Pine Barrens there can be readily detected a northern and southern element apparently advancing in opposite directions in a common effort to conquer the Pine Barrens. The more or less complex character of the Pine Barren flora to-day as regards its origin is apparently due to a combination of movements such as described above.

Of course, great physical changes in the earth's surface in geologic time must have had tremendous effect upon the flora, usually producing climatic changes which acted directly upon plant life. Such changes, of course, were responsible for the great fall in temperature coincident with the glacial epoch. Subsidences, too, which are known to have occurred at different periods, must have entirely exterminated the flora of large areas.

Just how far we can correlate existing conditions of plant distribution with geologic changes it is difficult to say. Most attempts of this sort seem to suppose a definiteness of knowledge of the time relationship of various geologic phenomena which we do not possess, and there is a tendency to assume constancy in the character of the flora of certain areas, while that of contiguous areas is undergoing tremendous changes. Such hypotheses, so far as they attempt detailed explanations, are purely conjectural.

Some facts, however, are clear. We know that the coastal plain was submerged at a time when the elevated Piedmont region to the west must have been covered with vegetation, and that plant life on the region north of the terminal moraine must have been for the most part exterminated during the glacial epoch. Therefore, the area between the coastal plain and the terminal moraine must have been continuously covered with plants for a much longer period than have these two regions themselves. When the coastal plain was elevated above the sea it must have received its flora from the contiguous country to the west or southwest. Furthermore, the several partial sub-

mergences of the New Jersey coastal plain after its first upheaval which are claimed by geologists* and other changing conditions may not only have resulted in several invasions of plants, but also in changes in the character of the plant life in the regions from which they came.

In every investigation in the plant life of the eastern United States we seem to find two elements—a boreal, more or less identical with the flora of northern Europe, and an austral, peculiarly American, and precisely the same thing is found in the study of animal life. Under prevailing conditions, however, and through adaptation certain species of animals of American austral origin have become typical boreal species to-day, and doubtless the same thing may be true of certain plants. This shows the necessity of distinguishing carefully between present geographical distribution and original source or center of dispersal of a species.

Now, supposing that the characteristic American austral flora covered the Piedmont area or a portion of it at the time the coastal plain was elevated, it is natural that it would have spread over into the new territory, or at least such species as were best adapted to its sandy stretches. Then, if from one cause or another there was an invasion of the more boreal element over the Piedmont plateau, we should probably have exactly the conditions that we find to-day—*i. e.*, the survival of the earlier flora in bogs and sandy areas and its disappearance where better soil has developed in favor of the more advanced flora now prevalent.† Part of the latter is also of austral origin, but, being suited only to richer soil, did not spread to any extent into the coastal plain.

In New Jersey the vegetation is at a much younger stage of its development. In the Pine Barrens we have only sand and bog plants, while in the Middle district we encounter the more advanced type of the American austral element and the evident influx of boreal plants already referred to from the north.

During the Pensauken period West Jersey was submerged, while the Pine Barrens were apparently cut off as an island.

* Cf. The Physical Geography of New Jersey by Rollin D. Salisbury, Vol. IV., Final Report State Geologist, 1898, especially pp. 92-170.

† Cf. Cowles. Physiographic Ecology of Chicago and vicinity, Bot. Gazette XXXI., 73-108, 145-182, 1901.

This submergence and the alluvial deposits along the Delaware river valley may have hastened the destruction of the true Pine Barren flora over this area and made soil conditions suitable for a more rapid influx of the type of vegetation that at present prevails there, though the isolated Pine Barren islands in the Middle District would argue rather for the gradual encroachment of the present flora coincident with a gradual change of soil.

Just what elements have been instrumental in changing conditions along the coast to make possible the existence of the coast strip already referred to I cannot say, nor does it seem worth while to theorize at present upon the possible explanations of the presence of boreal species in the Pine Barrens or the recurrence of so many boreal forms in southern Cape May.

Lists of the coastal plain bog plants that occur in the Piedmont area in Pennsylvania have already been given on page 46.

As to sandy ground plants characteristic of the coastal plain which occur in similar soil in the Piedmont region there are quite a number.

The following I have found on the mica slate and sandy hills of Chester or Delaware County, Pennsylvania:

<i>Quercus stellata.</i>	<i>Phlox subulata.</i>
“ <i>marilandica.</i>	<i>Galium pilosum.</i>
<i>Rubus cuneifolius.</i>	<i>Diodea teres.</i>
<i>Cracca virginica.</i>	<i>Eupatorium verbenæfolium.</i>
<i>Stylosanthes elatior.</i>	<i>Willugbaeya scandens</i> (swampy spots).
<i>Crotalaria sagittalis.</i>	<i>Sericocarpus linifolius.</i>
<i>Ascyrum hypericoides.</i>	<i>Ionactis linariifolius.</i>
<i>Lechea racemulosa.</i>	<i>Chrysopsis mariana.</i>
<i>Gaylussaccia frondosa.</i>	
<i>Asclepias amplexicaulis.</i>	

Others occur on the serpentine outcrops as follows:*

<i>Pinus rigida.</i>	<i>Meibomia obtusa.</i>
“ <i>virginiana.</i>	<i>Strophostyles umbellata.</i>
<i>Aristida oligantha.</i>	<i>Pieris mariana.</i>
“ <i>purpurascens.</i>	<i>Angelica villosa.</i>
<i>Baptisia tinctoria.</i>	<i>Eupatorium pubescens.</i>
<i>Meibomia rigida.</i>	<i>Aster dumosus.</i>
“ <i>marylandica.</i>	<i>Phlox subulata.</i>

* From F. W. Pennell, Proc. Acad. Nat. Sci. Phila. 1910, 541-584.

Dr. N. L. Britton* many years ago called attention to the resemblance of the plants of the Kittatinny and Shawangunk mountains of northern New Jersey to those of the Pine Barrens, and listed the following species common to both:

<i>Pinus rigida.</i>	<i>Lechea racemulosa.</i>
<i>Juncus militaris.</i>	<i>Polygala polygama.</i>
<i>Orontium aquaticum.</i>	<i>Epigæa repens.</i>
<i>Quercus ilicifolia.</i>	<i>Gaultheria procumbens.</i>
<i>Corema conradii.</i>	<i>Azalea viscosa.</i>
<i>Prunus pumila.</i>	<i>Gaylussacia frondosa.</i>
<i>Lespedeza hirta.</i>	<i>Gerardia quercifolia.</i>
<i>Cracca virginica.</i>	<i>Solidago puberula.</i>
<i>Lupinus perennis.</i>	<i>Solidago bicolor.</i>

All these isolated patches of an earlier type of vegetation in a region floristically older seem to me best explained by the assumption already made that they are relics of an earlier flora now nearly exterminated over the Piedmont region, but of which the present New Jersey coastal plain flora is a derivative. I claim no originality for this theory, as Dr. John W. Harshberger has explained it in detail,† basing his deductions mainly upon the consideration of the plants of the Kittatinny and Pocono Mountains, and Dr. Roland M. Harper has referred to it§ in connection with a study of bog and swamp plants. I merely wish to state that my investigations lead me to the same general conclusions, although, as already stated, certain other influences and elements are probably involved in the problem.

Dr. Harper brings up another interesting question in his paper, namely, the resemblance of the coastal plain flora to that of the glaciated areas on the other side of the Piedmont region. This resemblance has long been familiar to me, as during my studies of the coastal plain plants I have spent some time, nearly every year, in the mountains of Sullivan and Wyoming counties, Pennsylvania, and have found there the following species, which also occur in the New Jersey coastal plain:

* Bull. Torrey Bot. Club XI, p. 126, and XIV, p. 187.

† Proc. Acad. Nat. Sci., Phila., 1904, p. 606-609.

§ Rhodora VII, p. 69 (or VIII, p. 27).

<i>Lygodium palmatum.</i>	<i>Xyris carolinensis.</i>
<i>Dryopteris simulata.</i>	<i>Juncus pelocarpus.</i>
<i>Woodwardia virginica.</i>	<i>Drosera longifolia.</i>
<i>Potamogeton oakesianus.</i>	<i>Sarracenia purpurea.</i>
“ <i>confervoides.</i>	<i>Brasenia purpurea.</i>
<i>Calamagrostis cinnoides.</i>	<i>Nymphæa variegata.</i>
<i>Sporobolus serotinus.</i>	<i>Triadenum virginicum.</i>
<i>Panicularia laxa.</i>	<i>Illicioides mucronata.</i>
<i>Rhynchospora fusca.</i>	<i>Pyrola chlorantha.</i>
“ <i>alba.</i>	“ <i>secunda.</i>
<i>Scirpus subterminalis.</i>	<i>Rhododendron maximum.</i>
“ <i>torreyi.</i>	<i>Gaultheria procumbens.</i>
<i>Eleocharis robbinsii.</i>	<i>Vaccinium pennsylvanicum.</i>
<i>Eriophorum virginicum.</i>	<i>Chamædaphne calyculata.</i>
<i>Cladium mariscoides.</i>	<i>Limnanthemum lacunosum.</i>
<i>Carex limosa.</i>	<i>Menyanthes trifoliata.</i>
“ <i>trisperma.</i>	<i>Scutellaria galericulata.</i>
“ <i>canescens disjuncta.</i>	<i>Utricularia purpurea.</i>
“ <i>leptalea.</i>	“ <i>cornuta.</i>
<i>Scheuchzeria palustris.</i>	“ <i>clandestina.</i>
<i>Orontium aquaticum.</i>	“ <i>intermedia.</i>
<i>Eriocaulon septangulare.</i>	<i>Viburnum cassinoides.</i>

To which may be added from the other parts of the glaciated region of Pennsylvania :

<i>Carex collinsii.</i>	<i>Juncus militaris.</i>
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Some few of these are of boreal origin and have been driven south at some time and remained as isolated colonies in New Jersey, but the bulk of them are identical or similar to those which Dr. Harper mentions and which I agree with him and Dr. Harshberger have spread from the Piedmont region into the mountains upon the retreat of the ice just as they spread into the coastal plain upon its elevation from the sea. I am able to cite more isolated colonies of these plants existing in the Piedmont region than were known to Dr. Harper, but this, it seems to me, strengthens rather than weakens the theory, as do the lists of dry ground plants common to the Piedmont and coastal plain. Both classes of plants exist, as already explained, only in isolated colonies in the Piedmont, but were bogs more plentiful in this region, and had their draining been carried on less assiduously, the evidences of this early flora would have been more frequent. As it is, farming has been carried on so exten-

sively and land so well cleared and cultivated that anything like a natural swamp or bog is now almost unknown. The introduction of cattle and the influx of weeds soon work havoc with a bog or swamp so far as the botanist is concerned.

The relation between the New Jersey Pine Barrens and the coastal plain to the north and south is of interest.

With the lack of definite knowledge of the limits of the Pine Barrens and of the plants which are really characteristic of the region, it has been hitherto difficult to clearly consider the question.

Dr. Roland Harper has suggested that the New Jersey Pine Barrens form a well-defined center of distribution and are isolated from the Pine Barrens of Wilmington, N. C., which he regards as the next clearly marked Pine Barren center as we go down the coast, although he admits that the apparent lack of Pine Barren plants in the intervening country may be due merely to lack of knowledge.

In the recent report on the flora of Maryland Mr. Forrest Shreve* shows pretty conclusively that the lack of Pine Barren plants, so far as that State is concerned, is real. He says (p. 87) that the only Pine Barren species on the coastal plain of Maryland are *Cyperus grayi*, *Smilax walteri*, *Polygala lutea*, *Ilex glabra* and *Sclerolepis uniflora*.

All of these occur locally outside of the Pines in New Jersey, though they are most abundant in that region. Of Mr. Shreves' list of 94 characteristic plants of the coastal plain of Maryland; twenty do not occur as far north as New Jersey, but are not Pine Barren species; of the remainder 40 are restricted to the Middle, Coast or Cape May Districts of New Jersey (of which 4 have been found as stragglers in the Pines), while 28 are quite as abundant, or more abundant, in the Middle District, although they do occur in the Pine Barrens. To his five Pine Barren plants I should add from Mr. Shreves' Coastal Plain list *Ascyrum stans*, which in New Jersey is quite as typical of the Pines as the five he mentions.

It is obvious from this data that the coastal plain flora of

* Maryland Weather Service, Vol. III, 1910.

Maryland is distinctly affiliated with the Middle District flora of New Jersey and not with that of the Pine Barrens.

The investigations of the members of the Philadelphia Botanical Club in the State of Delaware would indicate that conditions there are very similar, that is to say, that the New Jersey Pine Barren element in the flora is very slight.*

The so-called Pine Barrens of Long Island are decidedly weak in the characteristic Pine Barren plants and take their place with the several Pine Barren islands which are scattered here and there through the Middle District of New Jersey. Of sixty-two species listed in several papers on the subject† only twenty-six are included in my list of typical New Jersey Pine Barren plants (p. 77), the rest being equally common throughout our region or restricted to the Middle District. Of the twenty-six, six occur at one outlying station, thirteen at two and four at three, while only three, *Dryopteris simulata*, *Chrysopsis falcata* and *Arenaria caroliniana* are confined to the Pines in New Jersey, and the first two of these are not found in the more Southern Pine Barrens, the *Dryopteris* being possibly of boreal affinities.

It would seem, therefore, that we have in the New Jersey and North Carolina Pine Barrens the sand and bog elements of a wide-spread American austral flora, which has been largely superseded by a more advanced element of similar origin over the rest of the coastal plain, both elements being richer the farther south we go, while along the western edge of the coastal plain, more especially to the northward, a boreal element has spread down over the fall line to a greater or less degree.

* Cf. C. F. Williamson, *Torrey*, 1909, p. 160; R. Harper, *Torrey*, 1909, p. 217.

† N. L. Britton, *Bull. Torr. Bot. Club* VII, p. 81 (1880).

A. J. Grout, *Torrey* II, p. 49 (1902).

S. E. Jelliffe, *Torrey* IV, p. 97 (1904).

R. M. Harper, *Torrey* VIII, p. 1 (1908).

SYSTEMATIC CATALOGUE

OF THE

Flowering Plants and Ferns of South-
ern New Jersey

(South of the Northern Boundary of Burlington
and Monmouth Counties)

With a Detailed Account of their Distribution and Time of
Flowering and Fruiting.

(113)

EXPLANATIONS.

The Synonymy consists of a reference to the original place of publication, with the type locality, and to the principal works on the region under consideration.

The Statement on Range of each species covers the entire State, the portion that refers to northern New Jersey being taken from Britton's Catalogue.

The List of Localities includes all herbarium specimens examined, and also records published in Britton's Catalogue and Keller and Brown's List, which I have no reason to doubt, even though specimens have not been seen. When records given in these two works are not substantiated by specimens from nearby stations or for any other reason seem open to question, they are discussed in foot notes. (Cf. Preface.)

When no letter is given after a locality it indicates that a specimen from this locality is in the Herbarium of the Philadelphia Academy. Specimens in other herbaria are indicated as follows:

OHB=O. H. Brown.

H=Benjamin Heritage.

CDL=Chas. D. Lippincott.

L=Bayard Long.

NB=N. J. Agricultural Exp. Sta.,
New Brunswick.

T=N. J. State Museum, Trenton.

NY=N. Y. Botanic Garden.

CP=Phila. College of Pharmacy.

P=Princeton University.

S=Witmer Stone.

UP=University of Penna.

C=Record taken from Britton's
Catalogue.

KB=Records from Keller and
Brown's List.

Kn=Records from Knieskern's List.

The exact location of the stations cited and some details as to the character of their flora will be found in the list of localities, p. 780.

The Keys for Identification are applicable only to the region here considered, and are intentionally artificial in character, being intended merely to contrast the most obvious characters of our plants as an aid to identification. They are not supposed to take the place of a Botanical Manual, a work which all students must have.

These Keys also cover all the common weeds of our region. Their names are enclosed in brackets with foot-note references, but they do not appear in the main text.

The Flowering and Fruiting Season (By Mr. Bayard Long)—The feeling that in a local flora the actual seasons of flowering and fruiting of the species in the region under consideration are of considerable interest and value, and the realization of the unsatisfactory nature, from a local standpoint, of this sort of data as presented in the manuals have led to the present attempt to designate the flowering and fruiting seasons of the indigenous plants of

southern New Jersey. An effort has been made to work out as accurately as possible the average seasons of bloom and fruit, but it has not been the intention to include extreme or unusual dates. The very early or very late records, usually represent individual plants in peculiar habitats or purely aberrant cases. Unfortunately, such specimens often turn up in herbaria in rather large numbers, because the average collector has a predilection to collect specimens in aberrant bloom, and he quite frequently neglects to note the fact on his label. Considerable care must be taken to eliminate such cases.

In many plants there is considerable variability in the time of flowering as the result of early or late springs; in others there is similar variability due to climatic or temperature differences in adjacent localities, or through elevation. While there is practically no variation of the last kind in southern New Jersey, there is often quite an appreciable difference in the date of flowering of the same species in West Jersey and on the coast, and one crossing the State on the railroad can readily appreciate the difference in the general advancement of vegetation in these two sections. It has, therefore, sometimes been necessary to average up in a rather crude way the results brought about by such causes of variability.

Flowering data as given in the manuals, when given at all, very often shows a distinct difference of opinion on the part of the authors. The novice finding the flowering season of a plant given in one work as "May-July," and in another "July-September," will be confused to say the least. This is an extreme example, it must be admitted, but it is the rule rather than the exception that there is a difference of some degree.

The corollary to the above paragraph is the ideal that was set up of endeavoring to avoid as much conjecture as possible and to work out the seasons from carefully collected field data and from accurately dated herbarium specimens. Furthermore, a lack of data has been frankly noted instead of covering it up by work of the imagination in an attempt to attain uniformity of treatment for each species. Data from territory not actually covered by the report has also been used, but only in a secondary or auxiliary way. Where the data available has been too meagre to warrant a statement a blank has been left as preferable to quoting dates from the manuals. Several means have been resorted to, however, to give some idea of the flowering season in such cases. Often when only one or two specimens were available their actual flowering or fruiting condition has been given with the date of collection. Occasionally an approximation is given with the addition of the word "probably."

It is to be regretted that more data and time were not obtainable for this work, as only one who attempts a task of this kind can realize what an enormous amount of data is necessary in order to reach satisfactory conclusions. My own field notes embrace observations extending over nearly seven years, but they prove a constant source of surprise in the absence of the very data that are most desired. To obtain full and accurate seasonal data for the plants of a region such as this would probably require many years of the most rigidly systematized field work.

In most works in which flowering dates are given no greater definiteness is attempted than the use of the months or sometimes only the seasons during which the plant may be found in bloom, with occasionally the qualifying

terms "early" and "late." In a local flora such as this it was felt that a greater degree of definiteness could be attained than is possible in a work of broad range. Whenever possible the month has been divided into three parts, "early," "mid" and "late," each approximately of ten days. Where such definiteness was not attainable or desirable the name of the month has been used, or sometimes that of the season.

A few examples will illustrate the plan adopted. The fruit of the chestnut may be said to be ripe very definitely when the burs open and the nuts fall to the ground, but it takes acute observation and discrimination to say just when the fruit of the hackberry is ripe. There is no definite change such as the opening of the chestnut bur, and the period of the presence of mature fruit on the tree is much longer and indefinite; so the term "autumn" is more accurate than a more definite word. In the case of the oaks the same term is used because of a lack of definite and comparative data.

Again, many plants, while they begin to flower and fruit at a definite time, continue indefinitely during the latter part of the growing season, the termination being a matter of individual vigor, advent of frost, change in moisture conditions. The end of the flowering and fruiting season of such species is indicated by the expression "into autumn" or "into October;" "into" being intended to denote an indefinite extension of time into that month or season, not necessarily just into it.

Plants which have occurred but a few times within our limits, but which are frequent in northern New Jersey, Pennsylvania or Delaware, have often been given flowering and fruiting periods based upon data from these immediately contiguous regions.

The seasons—spring, summer, autumn and winter—are used in their conventional sense,* beginning respectively on the first of March, June, September and December.

The word "sporadically" is used in the case of scattered or occasional bloom occurring after the ordinary season.

The fruiting season is that of fully mature—not merely well developed—fruit, *i. e.*, of dehiscent capsules, falling achenes, dropping nuts and "ripe" coloring of drupes. Many fruits develop rapidly and are fully grown long before they are "ripe," as the nuts of *Corylus*, the "bladder" of *Staphylea* and the seeds of various *Umbelliferae*.

Special treatments found necessary in certain groups are described under the family or generic headings. In some, such as *Cyperaceæ*, the only dates given are those of fully developed achenes, since so much depends upon their characters that this date is really the only one of taxonomic importance.

In the case of many trees or shrubs which bloom either before or simultaneously with the appearance of the leaves the relative condition of the leaves at the flowering date is given.

*Century dictionary and Cyclopedia, vol. VII, p. 5548, under season.

Key to the Plants of Southern New Jersey.

- a. No flowers; reproduction by spores (ferns and their allies).
 - b. Sporangies (spore cases) born under the scales of a terminal cone-like spike. Stems conspicuously jointed, the nodes covered by toothed sheaths. *Equisetaceæ*, p. 137
 - bb. Sporangies born in the axils of the crowded lanceolate or subulate leaves or of reduced scale-like leaves which form an erect spike. Plants somewhat moss-like, often branched and trailing. *Lycopodiales*, p. 139
 - bbb. Sporangies born at the base of slender, awl-shaped, rush-like leaves, which grow in a tuft from a round fleshy base rooting in the mud. Plants submerged. *Isoetaceæ*, p. 144
 - bbbb. Sporangies born on the back of a leaf (frond) in round, elongated or marginal patches (sori); or in a spike or cluster on the modified terminal (or middle) portion of the frond, or on a separate stalk (really a modified frond). *Filicales*, p. 119
- aa. True flowers present; containing stamens, pistils or both; reproduction by seeds.
 - b. Trees with linear or scale-like evergreen [except *Taxodium*] leaves; a resinous odor, fruit, a cone or a woody or fleshy berry. *Pinaceæ*, p. 146
 - bb. Not evergreen coniferous trees.
 - c. Parts of the flower usually in threes or sixes, leaves mostly parallel-veined. Embryo with a single cotyledon; early leaves never opposite. Stem not divided into bark, wood and pith. *Monocotyledons*, p. 153
 - cc. Parts of the flower mostly in fours and fives, leaves net-veined. Embryo with a pair of opposite cotyledons. Stem divided into bark, wood and pith, the wood in perennial species, growing by annual layers just under the bark. *Dicotyledons*, p. 380

PTERIDOPHYTA—Ferns and their Allies.

Order FILICALES

Southern New Jersey, with its large areas of flat, dry, sandy ground, and its lack of rocky banks and ledges, is a poor region for ferns. While thirty-two species and sub-species have been found within the limits of this list, twenty of them are really only stragglers from farther north, and occur locally in the richer soil of the Middle District, only two or three extending even sporadically to the Pine Barrens. Four species, *Onoclea sensibilis*, *Lygodium palmatum*, *Dryopteris thelypteris* and *Asplenium platyneuron*, are characteristic plants of the Middle district and, with the exception of *Lygodium*, are rather generally distributed. *Osmunda cinnamomea*, *O. regalis*, *Woodwardia areolata*, *W. virginica* and *Pteridium aquilinum* extend also over the Pine Barrens, where they are the only abundant ferns, while the rare *Schizæa pusilla* and *Dryopteris simulata* are for the most part confined to this region.

Fruiting Data.—The time of year noted under each species indicates the season of mature spores—that is, the season during which dehiscing sporangia are present.

Key to the Species.

- a. Plant climbing, "leaves" (frondlets) palmately divided, fruiting portion terminal. *Lygodium palmatum*, p. 129
- aa. Plant not climbing.
 - b. Sterile fronds linear and grass-like, curled and tangled about the base of the slender fertile frond (.5–1 dm. long), which bears the sporanges on minute pinne at its tip. *Schizæa pusilla*, p. 125
 - bb. Fronds not linear and grass-like.
 - c. Sporangies in a spike or panicle at the summit of the stem, with a leaf branching off horizontally from its side.
 - d. Leaf ovate, not cut or lobed; arising near the middle of the stem, plant 1–1.5 dm. high. *Ophioglossum vulgatum*, p. 122
 - dd. Leaf ovate or oblong; pinnate, plant .5–1 dm. high, sessile just below the spike. *Botrychium neglectum*, p. 122
 - ddd. Leaf more or less ternate, segments pinnately divided.
 - e. Leaf sessile about the middle of the stem, segments finely doubly pinnate. *B. virginianum*, p. 123

ee. Leaf petioled from near the base of the stem.

f. Segments pinnate, pinnæ not much cut.

B. obliquum, p. 123

ff. Pinnæ finely cut.

B. o. dissectum, p. 123

cc. Sporangies in a mass at the summit or middle of an erect "fern-like" frond or in small spots or lines (sori) on its back, or in several species on separate, modified, slender fronds. Fronds all pinnate (divided into lateral segments, which may be again divided).

d. Fronds not ternate.

e. Pinnæ finely serrate, but not lobed or cut.

f. Main stalk shining dark purplish, frond not over 25 mm. wide.

Asplenium platyneuron, p. 132

ff. Stalk not dark and polished.

g. Pinnæ on distinct pedicels with an acute lobe at the base.

Polystichum, p. 133

gg. Pinnæ widening at base and joining to form a winged margin to the stalk.

h. Frond less than 75 mm. wide round sori on back of fertile fronds.

Polypodium vulgare, p. 129

hh. Frond over 1 dm. wide, pinnæ finely serrulate, sometimes undulate, sori oblong in two rows on a separate frond with narrow linear pinnæ.

Woodwardia areolata, p. 131

ee. Pinnæ more or less lobed, but not cut to the midrib.

f. Lobes often mere undulations, pinnæ entire and distinctly narrower at the base. Fertile frond separate, a stalk with a panicle of round seed-like bodies at its summit bearing the sporangies.

Onoclea sensibilis, p. 137

ff. Lobes rather deeply cut, at least the basal ones, pinnæ broadest at the base, often somewhat triangular. Sori on back of frond.

Dryopteris cristata, p. 134

ccc. Pinnæ cut nearly or quite to the midrib.

f. Pinnules not toothed or subdivided.

g. Pinnules distinctly pedicelled, minutely serrulate, sporangies in a terminal panicle plant 6-9 dm. high.

Osmunda regalis, p. 124

gg. Pinnules united at their bases, forming a margin to the midrib.

h. Small ferns, leafy part of the frond rarely over 3 dm. in length.

i. Lowest pinnæ longest.

Dryopteris thelypteris, p. 133

ii. Two lower pairs of pinnæ slightly shorter than the longest.

D. simulata, p. 134

iii. Six lower pairs of pinnæ rapidly decreasing in size, last about 6 mm. long.

D. noveboracensis, p. 133

hh. Large ferns, leafy often 9 dm. in height, frond seldom less than 4 dm. long.

i. Several pairs of lower pinnæ rapidly decreasing in size, sori elongated.

Asplenium acrostichoides, p. 132

ii. Lower pinnæ about equal in length to the longest.

j. Stem with more or less rusty tomentum.

k. Pinnules usually more round at the tip and often slightly overlapping. Sporangies covering short pinnæ about the middle of the frond.

Osmunda claytoniana, p. 125

kk. Pinnules more acute and clearly separated. Sporangies on a separate stalk appearing in early spring.

Osmunda cinnamomea, p. 124

jj. Stem glabrous.

k. Six to nine lower pinnæ becoming rapidly smaller. Sporangies on separate modified frond.

Matteuccia, p. 137

kk. Lower pinnæ not shorter.

Woodwardia virginica, p. 131

jjj. Stem with brownish chaffy scales on lower part, pinnæ somewhat undulated or even lobed, sori round.

Dryopteris marginalis, p. 134

ff. Pinnules lobed or cut into segments.

g. Lower pinnæ with basal pinnules becoming much shorter.

Phlegopteris hexagonoptera, p. 136

gg. Lower pinnæ not narrowed at base.

h. Leafy part of frond not over 1.7 dm. long.

Filix fragilis, p. 135

hh. Leafy part of frond normally more than 3.7 dm. long.

i. Stem chaffy with brown scales.

Dryopteris spinulosa, p. 135

ii. Stem glabrous or a few scales near the base.

j. Dark green, frond glabrous.

Asplenium filix-femina, p. 132

jj. Light green frond pubescent below and fragrant. *Dennstaedtia punctilobula*, p. 136

dd. Fronds ternate.

e. Not over 1 dm. in diameter, delicate.

Phlegopteris dryopteris, p. 136

ee. Over 3 dm. in diameter, thick. *Pteridium aquilinum*, p. 130

ccc. Sporangies under revolute edge of the pinnæ or pinnules. Frond branching out more or less horizontally from the stem.

d. Frond ternate, thick, singly or doubly pinnate, 3 dm. or more across. *Pteridium aquilinum*, p. 130

dd. Frond dichotomously branched, branches pinnate and arranged somewhat palmately; stem dark brown or black and highly polished. *Adiantum pedatum*, p. 130

Family OPHIOGLOSSACEÆ. Adder's Tongues.

OPHIOGLOSSUM L.

Ophioglossum vulgatum L. Adder's Tongue.

Ophioglossum vulgatum Linnæus, Sp. Pl. 1062. 1753 [Europe.]—Britton 304. Keller and Brown 7.

Ophioglossum bulbosum Pursh II. 655.

Ophioglossum arenarium E. G. Britton, Bull. Torrey Club XXIV. 555. 1897 [Holly Beach, N. J.].—Keller and Brown 7.—J. Crawford, Bartonian I. 18. 1909.

Damp woods in the North and sparingly in the Middle district; local. Along the coast islands occurs a more slender form, often with two or three stalks from the same root, which was originally discovered by Mrs. E. G. Britton in sandy, shaded ground at Holly Beach and described as a new species *O. arenarium*. The type colony has since been destroyed, but the form has been rediscovered at Longport by Mr. Joseph Crawford and on Long Beach Island by Mr. Bayard Long, growing in hollows among the sand dunes. The drier exposed habitat is doubtless responsible for the peculiar characters, which do not seem worthy of recognition, as similar forms have been found in colonies of true *O. vulgatum*.

Spores Mature.—Early June to early July, apparently somewhat later in the coastal plants.

Middle District.—Monmouth Co. (C), Hanover (C), Browns Mills (C), Medford, Six miles west of Woodstown, Riddleton.

Coast.—Surf City (L), Longport, Wildwood.

BOTRYCHIUM Swartz.

Botrychium neglectum A. Wood. Meriden Grape Fern.

Botrychium neglectum A. Wood, Classbook of Botany 1846. p. 635 [Meridan, N. H.].—Keller and Brown 8.

Botrychium matricariaefolium Britton 305.

Casual north, but very rare in our district, known only from Riddleton, Salem Co., where it was collected in low woodland.

Spores Mature.—Early June, during a very brief period. The fronds arise in spring and perish during the summer.

Middle District.—Riddleton.

Botrychium obliquum Muhl. **Ternate Grape Fern.**

Botrychium ternatum obliquum "Muhlenberg" Willdenow, Sp. Pl. V. 63. 1810 [Pennsylvania].—A. Brown, Bull. Torrey Club VII. 114.—Britton 305.

Botrychium obliquum Barton II. 205.

Botrychium lunarioides Knieskern 41.

Woods and open ground throughout, but rare in the Pine Barrens.

Spores Mature.—Early September to late September, rarely in October or November. Fronds arise in midsummer, the fertile portion evergreen, generally persisting into the following spring.

Middle District.—Monmouth Co. (K), New Egypa, Birmingham, Taunton, Delaire, Oaklyn (S), Haddonfield (UP), Lawnside (S), Orchard (S), Lindenwold, Clarksboro (UP), Tomlin, Swedesboro, Glassboro, Dividing Creek, *Coast Strip*.—Pt. Pleasant (S), Manahawkin, Surf City (L), Ship Bottom (L), Atlantic City, Ocean City (S), Anglesea (UP).

Pine Barrens.—Albion, Egg Harbor City.

Cape May.—Dennisville (S), Sea Isle Jnc., Anglesea Jnc. (S), Cold Spring (OHB), Cape May (UP).

Botrychium obliquum dissectum Spreng. **Feathery Grape Fern.**

Botrychium dissectum Sprengel, Anleit III.: 172. 1804 [Virginia].

Botrychium ternatum dissectum Britton 305.

Frequently occurring with the preceding, into which it seems to merge.

Spores Mature.—Early September to late September, rarely in October, apparently beginning to mature slightly later than the last. Life history of fronds the same.

Middle District.—Medford (Poyser), Oaklyn (S), Clarksboro (UP), Tomlin, Salem (S).

Coast Strip.—Surf City (L), Ocean Beach (UP).

Pine Barrens.—Albion, Mays Landing (S), Egg Harbor City (UP).

Cape May.—Cold Spring (OHB).

Botrychium virginianum (L.). **Rattlesnake Fern.**

Osmunda virginiana Linnæus, Sp. Pl. 1064. 1753 [Virginia].

Botrychium virginianum Britton 305.

A well-known fern of rich woodland in the North and Middle districts, becoming scarce southward.

Spores Mature.—Late May to late June, rarely in July, rather variable. Fronds arise in April; fertile portion withering shortly after maturity, but persisting into summer, sterile remaining green until early autumn.

Middle District.—Farmingdale, New Egypt, Bordentown, Kinkora, Medford (S), Merchantville (C), Little Timber Creek (C), Clarksboro (UP), Mickleton, Sewell (UP), Swedesboro, Quinton.

Cape May.—Cold Spring (OHB).

Family OSMUNDACEÆ. Cinnamon Ferns.

OSMUNDA L.

Osmunda regalis L. Royal Fern.

Osmunda regalis Linnæus, Sp. Pl. 1065. 1753 [Europe and Virginia].—Knieskern 41.—Britton 312.

In wooded or open swamps throughout.

Spores Mature.—Mid-May to early June, immediately after which the fertile portion withers and dies, but usually persists for some time.

Middle District.—Farmingdale, New Egypt, Burlington, Delanco, Medford (S), Gloucester (UP), Lindenwold (S), Sicklerville (S), Washington Park, Mickleton, Swedesboro, Beaver Dam.

Coast Strip.—Spray Beach (L), Surf City (L), Beach Haven Cr. (L), Wildwood.

Pine Barrens.—Forked River, Long Causway (S), Speedwell, Hammon-ton (Bassett), Mays Landing (UP), Egg Harbor City (UP), Williamstown Inc., Cedar Brook.

Cape May.—Court House (S), Goshen (S) Cape May (OHB).

Osmunda cinnamomea L. Cinnamon Fern.

Osmunda cinnamomea Linnæus, Sp. Pl. 1066. 1753 [Maryland].—Knieskern 41.—Britton 312.

Osmunda c. frondosa Britton 312.

Moist situations, throughout. One of the most widely distributed ferns of our district.

Variety *O. c. glandulosa* Waters (Fern Bulletin X, 1902, p. 21—Maryland), occurs with the typical form at several stations.

The Cinnamon Fern is very conspicuous in early spring, when we see the tightly coiled frond tips pushing up all around the

tussock-like root stalk of last year and gradually unfurl into the erect slender cinnamon plumes, which give the plant its name, and from which clouds of the fine dust-like spores are detached when we brush against them. About the time they have reached this stage the green sterile fronds of the ordinary fern-like structure unfurl, after which the fruiting fronds wither and perish. This is our largest fern, and the broad green fronds, sometimes three feet in length, form a conspicuous feature of both wooded and open swamps.

Spores Mature.—Early or mid-May, as the fronds uncoil, very shortly after which the fertile fronds begin to wither and soon perish.

Middle District.—Farmingdale, New Egypt, Delanco, Medford (S) Delaire, Camden, Haddonfield (S), Lindenwold (S), Tomlin, Mickleton, Swedesboro, Mantua, Glassboro, Beaver Dam.

Pine Barrens.—Allaire (S), Atco (UP) Andrews, Cedar Brook, Hammononton (Bassett), Mays Landing (UP), Manumuskin (UP).

Coast Strip.—Beach Haven Terrace (L), Spray Beach (L).

Cape May.—Goshen (S), Cape May (OHB).

***Osmunda claytoniana* L. Clayton's Fern.**

Osmunda claytoniana Linnæus, Sp. Pl. 1066. 1753 [Virginia].—Britton 312.

North Jersey, but casual or rare in our region, occurring only in the Middle district.

Spores Mature.—Early or mid-May as the fronds uncoil. Fertile portion is commonly dried up by late May, but persists through the summer.

Middle District.—Freehold (C), New Egypt, Kinkora, Delaire, near Camden (UP), Swedesboro, Mullica Hill (H).

Family SCHIZÆACEÆ.

SCHIZÆA J. E. Smith.

***Schizæa pusilla* Pursh. Curly Grass.**

Pl. 66, Fig. 1.

Schizæa pusilla Pursh, Fl. Am. Sept. 657. 1814 [Quaker Bridge, Burlington Co., N. J.].—Rafinesque, Amer. Mo. Mag. II., p. 174. 1818.—Nuttall II. 249.—Knieskern 41.—Willis 79.—Britton 312.—Keller and Brown 8.—Cooper, Ann. Lyc. N. Y. II. 266. 1828.—Redfield, Bull. Torrey Club VI. 82. 1876.—Saunders, Proc. Acad. Nat. Sci. Phila. 1900, pp. 548, 549.

This curious little fern, which bears so little resemblance to a fern as popularly understood, has long been the most prized among the many botanical rarities of the Jersey Pine Barrens. It was first discovered in 1805 at Quaker Bridge, where an inn well known to the botanists of old, offered shelter to those who wished to stop over night on their way to the coast. Situated as it was in the very heart of this interesting country, it furnished one of the few available stopping places for those who desired to study the flora or fauna of the Pines, and who in the absence of railroads were unable to return to Philadelphia at night. It thus became the only known station for many species of plants which were later found to have a much wider distribution. With the coming of the railroad and abandonment of the old wagon roads to the sea, the old hostelry at Quaker Bridge disappeared, as did other similar buildings, so that the spot is now more of a wilderness and less accessible than it was a century ago. The party who had the good fortune to discover the *Schizæa* consisted of Dr. C. W. Eddy, J. Le Conte, Fredk. Pursh and C. Whitlow. Pursh described the curious little plant in his *Flora* in 1814, leaving one to infer that he alone was the discoverer, but Rafinesque, in his review of Pursh's work* states that he did not find any of the specimens and that he described the plant without the permission of the real discoverer. Dr. Torrey has confirmed the first part of this statement, saying that Dr. Eddy was the discoverer and that Le Conte was the only other member of the party to find any specimen [Redfield Torrey Bull. VI, 82-83]. The plant was apparently not found again until July, 1818, when Dr. Torrey and Wm. Cooper drove from Philadelphia to South Amboy, by way of Quaker Bridge and Monmouth, spending a week in the Pines, while Dr. Torrey made his first acquaintance with the peculiar flora.

The order of its subsequent discovery at other stations has not been recorded; we only know that Torrey and Gray had obtained it at Toms River by 1837. Dr. Joseph Leidy collected it at Batsto in 1861 and C. F. Parker at Atsion in 1870 and at Egg Harbor City by 1884.

* Amer. Mo. Mag. II, p. 174.

Schizæa is now known from some thirty stations, all within the Pine Barrens, and it will doubtless be found in almost any spot within this region where the conditions are favorable. A moist, sandy spot on the edge of a White Cedar swamp is its favorite habitat, where it grows in close association with young Cedars, *Lycopodium carolinianum*, *Drosera filiformis*, etc. Mr. Clutes' statement in his List of N. A. Ferns—Fern. Bull. 1905, p. 120—that it is "found in Cranberry Bogs" is decidedly misleading. It may sometimes grow where cranberries grow, but not in what are known as Cranberry bogs, and I am inclined to think that the artificial cultivation, flooding, etc., would exterminate it, as it does some of our other rarities.

At Speedwell I have found it in the heart of a Cedar Swamp growing on the vertical sides of cuts in the sandy roads made by heavy wagons.

Perhaps the most interesting station is that discovered by Mr. E. B. Bartram, near Seaside Park, on a narrow point of land lying between Barnegat Bay and the ocean. Here, just back of the sand dunes, within one hundred yards of the beach, is a moist hollow with a few little White Cedars, among which grows the *Schizæa* in company with its usual associates, the *Lycopodium* and *Drosera*.

The largest specimens that I have seen bore fruiting fronds 120-150 mm. in height.

The plant is easily overlooked, though readily found when one is familiar with the fern and its haunts. The late Dr. J. Bernard Brinton, who was one of those who discovered it at Egg Harbor City, told me of his amazement when, while sitting upon the ground eating his lunch, the little plant seemed to rise up under his eyes as they for a moment became focused upon a certain spot to which something had accidentally attracted his gaze.

When the American Association for the Advancement of Science met at Philadelphia, in 1884, the botanists in attendance, including a number of prominent British naturalists who had come on from the meeting of the British Association in Canada, were taken on a special excursion to pay their respects to *Schizæa* and the Pine Barrens, probably the most notable trip ever made to this region. It has been described as follows:

"The excursion of Saturday [Sept. 6, 1884] to the Pine Barrens was, barring the heat, thoroughly enjoyable * * * When the coach which was devoted to the botanists was left on the side track at Egg Harbor [City] the view that greeted their eyes was a level, sandy plain, with low vegetation interspersed with shrubs and trees here and there. It was determined to make a sally eastward first. In spite of the fact that the thermometer had passed above the nineties, the whole party of fifty, including ladies and Britishers, wandered out for a mile or so amid a vegetation remarkably rich in showy and interesting flowers and botanical rarities. But the heat would not permit much loitering, and they soon returned with red faces, but arms full of treasures. After a short rest all but a few summoned up fortitude to start out again, going westward for a full mile along the railroad track. This gave a different flora. But the zeal of the excursionists, which was emulating the temperature, reached its highest point when the cry ran all along the line that the *Schizaea* was found. There was a succession of disappearing forms down the railroad embankment into the thicket, where all, great and small, went down on hands and knees to gather the precious little ferns of such unfern-like aspect. But it is impossible to tell all that happened. A bounteous lunch was served upon the return, after which Mr. I. C. Martindale called the botanists to order. Prof. W. J. Beal presided. Dr. Gray gave some reminiscences of his early visits to this region. He thought it was in 1832 that, in company with Dr. Torrey, he first saw the Pine Barrens at Toms River and had found the *Schizaea*. The following year he spent a week at Quaker's Bridge, and had not been in the Pine Barrens since till the present occasion. Mr. William Carruthers, of the British Museum, spoke pleasantly of the enjoyment which the day had afforded him, and his surprise to see a region so apparently barren supporting such a varied vegetation, particularly at this season of the year. He was only able to recognize *Pteris* and *Osmunda regalis* as plants he had previously seen in a living state."*

* Bot. Gazette IX. 1884, p. 161.

Spores Mature.—Middle or late August through a very short period. Fertile fronds uncoil with the sterile in late May and grow to full height by late July. They dry soon after maturity and usually persist into the next summer or occasionally even for a full year. Sterile frond evergreen.

Pine Barrens.—Toms River, Ferago=Bamber, Whitings, Double Trouble, Island Heights Inc., Forked River, Waretown, Mayetta, Tuckerton, Speedwell (S), Chatsworth, Inskip, Joes Bridge, 5 mi. N. E. Hammonton (UP), Eighth St., Atsion, Quaker Bridge, Batsto, Pleasant Mills, Opp. Crowleytown, Egg Harbor City, Hospitality Bridge, Seven mi. S. of Hammonton (UP), Pancoast, Absecon.

Coast Strip.—Seaside Park.

LYGODIUM Swartz.

Lygodium palmatum (Bernh.). Climbing Fern.

Gisopteris palmata Bernhardt, Schrad. Journ. Bot. II. 129. 1800 [Penna., Ky. and Va.].

Lygodium palmatum Nuttall 248.—Knieskern 41.—Willis 79.—Britton 311.—Keller and Brown 8.

This, our only trailing fern, is found in north Jersey, but is perhaps most frequent, though always local, along streams in the Middle district, especially in Burlington county. It grows in dense thickets, climbing up on the bushes and herbs to a height of two or three feet.

Spores Mature.—Late September into October or even later. Fertile portion of the frond uncurling with the sterile during spring; scarcely evergreen, becoming brown and dried during winter. Sterile frondlets remaining green over winter, but perishing the following spring along with the fertile.

Middle District.—Matawan (C), Keyport (NY), Shark River (C), Burlington (UP), New Lisbon, Brown's Mills, Moorestown (C), Four miles east of Haddonfield, Medford, East Magnolia, Clementon.

Pine Barrens.—White Horse (C), Atsion (KB)

Family POLYPODIACEÆ. True Ferns.

POLYPODIUM L.

Polypodium vulgare L. Polypody.

Polypodium vulgare Linnæus, Sp. Pl. 1085. 1753 [Europe].—Britton 305.—Keller and Brown 9.

Common in the northern half of the State; rare and local in the Middle district.

Spores Mature.—Mid-July, well into autumn. Fronds evergreen, persisting with the large sori well into the next year, often to midsummer.

Middle District.—Bordentown, Birmingham, Vincentown (C), Delaware river below Gloucester (P), Swedesboro, Sharpstown.

ADIANTUM L.

Adiantum pedatum L. Maidenhair.

Adiantum pedatum Linnæus, Sp. Pl. 1095. 1753 [Canada and Virginia].—Britton 306.—Keller and Brown 9.

North Jersey, but rare in our region, occurring locally in the Middle district.

Spores Mature.—Mid-July to late September.

Middle District.—Keyport (C), Farmingdale, New Egypt, Vincentown (C), Auburn (C). Mr. C. D. Lippincott assures me that it formerly grew at Swedesboro, but has been exterminated.

PTERIDIUM Scopoli.

Pteridium aquilinum (L.). Bracken.

Pteris aquilina Linnæus, Sp. Pl. 1075. 1753 [Europe].—Barton II. 211.—Knieskern 40.—Willis 78.—Britton 306.

Occurs throughout, but especially abundant in the Pine Barrens, where, with the several species of Huckleberries and the "Sweet Fern," it forms the bulk of the undergrowth in open pine woods. It is indeed the most abundant of the species mentioned, and often large areas are covered by it alone, the flat tops of the fronds making an even surface which stretches away among the scattered trunks of the Pitch Pines as far as the eye can reach.

The form *P. a pseudocaudatum* Clute (Fern Bull. VIII., 39, 1900, Babylon L. I.) occurs at various stations and in all sorts of combinations and gradations to true *aquilinum*.

Spores Mature.—July to September, showing great variation in date.

Middle District.—Long Branch, New Egypt, Sicklerville, Swedesboro, Diving Creek.

Pine Barrens.—Toms River (NY), E. Plains, Waretown, Barnegat, Tuckerton, Speedwell, Winslow, Taunton, Hammonton (Bassett), Egg Harbor.

Coast Strip.—Surf City (L), Atlantic City (L).

Cape May.—Bennett (S).

WOODWARDIA J. E. Smith.**Woodwardia virginica (Linn.). Virginia Chain Fern.***Blechnum virginicum* Linnæus, Mantissa II. 307. 1771 [Virginia].*Woodwardia virginica* Knieskern 41.—Britton 306.—Keller and Brown 10.

Casually in the North and Middle districts, but most plentiful in the Pine Barrens, where it is the most abundant fern in damp or wet localities.

Spores Mature.—Late June to late July, most abundantly, but sporadically on through the summer or even into early autumn.

Middle District.—New Egypt, Allaire, Camden (UP), Paulsboro, Bridgeport, Repaupo, Mickleton (UP), Clarksboro (UP), Sicklerville, Swedesboro, Beaver Dam.

Pine Barrens.—Bamber, Pasadena, Long Causway, Clementon, Bear Swamp (S), Atco (UP), Ancora (UP), Cedar Lake (T), Vineland (S), Winslow, Hammonton, Pleasant Mills (UP), Batsto, Egg Harbor City, Weekstown, Twelfth St., Folsom, Tuckahoe (S).

Coast Strip.—Belmar, Asbury Park (S), Deal (C), Ocean Beach (C), Forked River, Manahawkin, West Creek, Tuckahoe, Anglesea.

Cape May.—Goshen, Cape May (OHB).

Woodwardia areolata (L.). Narrow-leaved Chain Fern.

Acrostichum areolatum Linnæus, Sp. Pl. 1069. 1753 [Virginia and Maryland].

Woodwardia onocleoides Pursh, II. 669. Nuttall II. 252.—Barton II. 212.

Woodwardia angustifolia Torrey Cat. N. Y. Plants 81. 1819.—Knieskern 40.

Woodwardia areolata Britton 307.—Keller and Brown 10.

Casual in north Jersey, plentiful in the Middle and Pine Barren districts.

Spores Mature.—Mid-August to mid-October, but the spores retained within the indusia and not scattered apparently until the frond perishes.

Middle District.—Farmingdale, Allaire (S), New Egypt, Camden, Haddonfield, Moorestown (UP), Riverton (UP), Westmont (S), Medford, Taunton (S), Washington Park, Lawnside (S), Lindenwold, Tomlin (S), Center Square, Clementon, Sicklerville (S), Swedesboro, Dividing Creek, Millville, Salem.

Pine Barrens.—Tom's River (UP), New Lisbon, Bamber, Pen Bryn (S), Waterford, Cedar Brook, Hammonton, Pleasant Mills, Egg Harbor City (UP).

Coast Strip.—Asbury Park, Forked River, Manahawkin, Coxes, Surf City (L), Beach Haven Crest (L), Anglesea (UP).

Cape May.—Goshen (S), Dennisville (S), Court House, Cape May (OHB).

ASPLENIUM L.

Asplenium platyneuron (L.). Ebony Fern.

Achrostichum platyneuron Linnæus, Sp. Pl. 1069. 1753 [Virginia].

Asplenium platyneuron Britton 307.—Saunders Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

Throughout, but most abundant northward. In our region it occurs usually on sandy shaded banks or in thickets.

Spores Mature.—Early June to late July. Sterile fronds semi-evergreen, the fertile with heavy sori scarcely persisting through the winter.

Middle District.—Shark River, Farmingdale, New Egypt, Hartford, Birmingham, Arneys Mt., Medford (S), Tomlin, Westville (UP), Pitman, Glassboro, Swedesboro.

Pine Barrens.—Dover Forge, Bamber, Speedwell (S), Calico.

Coast Strip.—Asbury Park, Peermont, Anglesea (UP).

Cape May.—Bennett (S), Cold Spring.

Asplenium filix-fœmina (L.). Lady Fern.

Polypodium F[ilix] fœmina Linnæus, Sp. Pl. 1090. 1753 [Europe].

Asplenium filix-fœmina Britton 308.—Saunders, Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

Asplenium filix-fœmina laciniatum Moore, Bull. Torrey Club VI. 183.

A common species in North Jersey, scarcer southward and mainly restricted to the Middle district. There is a snigle Pine Barren record at Calico, where Mr. Saunders found this and other species growing on the inside of an old well.

Spores Mature.—Early July to early September; indusia very soon wither.

Middle District.—Navesink Highlands (C), Shark River (UP), Freehold (C), Farmingdale, Birmingham, Pemberton (C), Hartford, Camden (P), Locust Grove (S), Medford (S), Gloucester, Kirkwood (C), Sewell (S), Pitman, Mickleton (UP), Swedesboro, Yorktown (S).

Pine Barrens.—Calico.

Coast District.—Coxe's.

Cape May.—Cape May (OHB).

Asplenium acrostichoides Sw. Silvery Fern.

Asplenium acrostichoides Swartz Schrad. Jour. Bot. II. 54. 1800 [No locality given].—Britton 307.

A northern species reported by Willis from Freehold, within our limits. A specimen in the University of Pennsylvania from

the herbarium of the late Isaac Burk is labeled "deep swamps in Jersey." As Mr. Burk did most of his collecting in south Jersey, it is probable that this specimen came from somewhere in our region.

POLYSTICHUM Roth.

Polystichum acrostichoides (Michx.) Christmas Fern.

Nephrodium acrostichoides Michaux, Fl. Bor. Am. II. 267. 1803 [Pennsylvania, Carolina and Tennessee].

Aspidium acrostichoides Knieskern 41.—Britton 310.

Aspidium acrostichoides schweinitzii Britton 310.

Common northward, but only casual within our range and restricted to the Middle district, except an isolated colony which I discovered at Speedwell in the heart of the Pine Barrens and one at Cape May.

Spores Mature.—Early June to late June; indusia soon withering. Fronds evergreen, except the fertile portion which withers during the winter.

Middle District.—Farmingdale, Shark River (UP), New Egypt, Bordentown, Birmingham, Springdale (S), Woodbury, Sewell (S), Swedesboro, Salem (S).

Pine Barrens.—Speedwell (S).

Cape May.—Cape May (O. H. Brown).

DRYOPTERIS Adanson.

Dryopteris noveboracensis (L.) New York Fern.

Polypodium noveboracense Linnæus, Sp. Pl. 1091. 1753 [Canada].

Aspidium Noveboracense Knieskern 41.—Britton 309.

Common northward; southward restricted to the Middle, Coast and Cape May districts, where it is less common.

Spores Mature.—Late June into August.

Middle District.—Farmingdale, Allaire (S), Birmingham, Haddonfield (S), Westville (UP), Mickleton (H), Lawnside (S), Sewell (S), Andrews, Swedesboro, Yorktown, Dividing Creek.

Coast Strip.—Coxes, Manahawkin, Ocean City (UP).

Cape May.—Cape May (OHB).

Dryopteris thelypteris (L.) Marsh Fern.

Acrostichum Thelypteris Linnæus, Sp. Pl. 1071. 1753 [Europe].

Aspidium Thelypteris Britton 308.

Throughout, but not common in, the Pine Barrens.

Spores Mature.—Mid-August well into September.

Middle District.—Sandy Hook (C), Farmingdale, Pt. Pleasant, New Egypt, Hartford, Medford (S), Washington Park, Mickleton (H), Sewell (S), Clementon, Atco (C), Sicklerville (S), Glassboro, Swedesboro, Yorktown, Beaver Dam.

Pine Barrens.—Hammonton (S).

Coast Strip.—Seaside Park (UP), Barnegat, Manahawkin, Beach Haven Terrace (L), Surf City (L), Beach Haven Crest (L), Holgate's (L), Ocean City (S), Petersburg (S), Wildwood.

Cape May.—Goshen (S), Three miles west Court House (S), Cape May.

***Dryopteris simulata* Davenp. Massachusetts Fern.**

Aspidium simulatum Davenport, Bot. Gaz. XIX 495. 1894 [Seabrook Essex Co. Mass.].

Dryopteris simulata Stone, Proc. Acad. Nat. Sci., Phila., 1908, 457.

Originally discovered in our region at Clementon by Mr. Stewardson Brown and apparently restricted to boggy spots or cedar swamps on the edge of the Pine Barrens.

Spores Mature.—Early August to late September.

Middle District.—Glassboro, Shark River.

Pine Barrens.—Farmingdale, Shark River, Double Trouble, Forked River, Cox's, Clementon, Andrews, west of Sicklerville, Cedar Brook, Batsto Forks.

***Dryopteris cristata* (L.).* Crested Fern.**

Polypodium cristatum Linnæus, Sp. Pl. 1090. 1753 [N. Europe].

Aspidium cristatum Britton 309.

Northern New Jersey; occurring locally southward in the Middle district.

Spores Mature.—Late June to late July; indusia commonly withering by early July.

Middle District.—Red Bank (C), Farmingdale, Hanover, Moorestown (UP), Camden (P), Medford (S), Lawnside (S), Mickleton (H), Tomlin, Sewell (S), Atco (C), Swedesboro, Mullica Hill (C).

Coast Strip.—Cox's.

Cape May.—Cape May (O. H. Brown).

***Dryopteris marginalis* (L.). Evergreen Wood Fern.**

Polypodium marginale Linnæus, Sp. Pl. 1091. 1753 [Canada].

Aspidium marginale Britton 309.

A common fern of the northern counties, rare and local within our limits and occurring only in the Middle district.

* *Dryopteris cristata clintoniana* Eaton (Gray's Man. Ed. V. 665. 1867.—New York), was reported within our limits only from Little Timber Creek, Camden Co., by I. C. Martinale in Britton's Catalogue. The specimen was not examined until after this page was in type. It seems to be correctly identified.

Spores Mature.—Early June to early July, indusia soon withering. Fronds evergreen, persisting with large brown sori over the winter.

Middle District.—Farmingdale, Bordentown, Riverton (UP), Birmingham, Camden (P), Woodbury, Mickleton (C),* 5 mi. S. of Swedesboro (CDL).

***Dryopteris spinulosa* (Retz.). Spinulose Shield Fern.**

Polypodium spinulosa Retzius, Fl. Scand. Ed. 2. 250. 1795 [Scandinavia].

Common northward, south locally in the Middle district.

Spores Mature.—Mid-May to early June; indusia soon withering. Fronds barely persisting to the beginning of winter.

Middle District.—New Egypt, Glassboro, Mickleton.

***Dryopteris spinulosa intermedia* Muhl. Spinulose Shield Fern.**

Aspidium intermedium "Muhlenberg" Willdenow, Sp. Pl. V. 262. 1810 [Pennsylvania].—Barton II. 208.

Aspidium spinulosum var. *intermedium* Britton 309.

Dryopteris spinulosa Saunders, Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

Common northward, south locally in the Middle district and rarely on the coast, to Cape May.

Spores Mature.—Mid-May to early June; indusia soon withering. Sterile fronds evergreen, but fertile fronds mostly perish during the winter.

Middle District.—Farmingdale (S), Pt. Pleasant, Bordentown, Hartford, Birmingham, Berlin, Atco (C), Woodbury (UP), Swedesboro, Yorktown.

Coast Strip.—Cox's.

Cape May.—Cape May (OHB).

FILIX Adanson.

***Filix fragilis* (Linn.). Brittle Fern.**

Polypodium F[ilix]-fragile Linnæus, Sp. Pl. 1091. 1753 [Europe].

Cystopteris fragilis Britton 310.

Filix fragilis Keller and Brown 14.

Common northward, but known within our limits only from Freehold (Willis), from Medford, where it was discovered May 30, 1903, by Mr. Stewardson Brown growing on the vertical bank of a small stream in deep woods, and from Pitman in a similar situation discovered by Mr. Bayard Long.

* Dr. Harshberger's specimen reported from Seaside Park (Proc. Acad. Nat. Sci., Phila., 1900, 623) proves to be *Osmunda cinnamomea*.

Spores Mature.—Late May to early July; indusia soon withering.

Middle District.—Freehold (C), Medford, Pitman, Mantua (H).

DENNSTÆDTIA Bernhardi.

Dennstædtia punctilobula (Michx.). Sweet-scented Fern.

Nephrodium punctilobulum Michaux, Fl. Bor. Am. II. 268. 1803 [Canada].

Dicksonia punctilobula Nuttall II. 253.—Britton 311.

North Jersey and locally southward in the Middle district and on the coast. Also found by the writer at Cape May.

Spores Mature.—Mid-June to apparently early August.

Middle District.—Freehold (C), Shark River, Hornerstown, Birmingham, Arneys Mt. (S), Lenola (UP), Taunton (S), Mickleton (H), Blackwood, Sewell (S), Andrews, Swedesboro, Yorktown.

Coast Strip.—Manahawkin, Cox's.

Cape May.—Cape May.

PHEGOPTERIS Fée.

Phegopteris hexagonoptera (Michx.). Broad Beech Fern.

Polypodium hexagonopterum Michaux, Fl. Bor. Am. II. 271. 1803 [Carolina and Virginia].

Common in rocky woods of the northern counties and occasionally in the Middle district.

Spores Mature.—Mid-June apparently into August.

Middle District.—Long Branch, New Egypt, Swedesboro.

Phegopteris dryopteris (L.). Oak Fern.

Polypodium dryopteris Linnæus, Sp. Pl. 1093. 1753 [Europe].

Phegopteris dryopteris Saunders, Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

A typical mountain species of northern New Jersey discovered growing in the shaft of an old well at Calico, in the heart of the Pine Barrens, by Mr. C. F. Saunders, July 5, 1899. Not known from elsewhere within our range.

Spores Mature.—Probably in June, quite dehiscent in the above specimen.

Pine Barrens.—Calico.

MATTEUCCIA Todaro.**Matteuccia struthiopteris** (L.). Ostrich Fern.

Osmunda struthiopteris Linnæus, Sp. Pl. 1066. 1753 [Northern Europe].

Onoclea struthiopteris Britton 310.

Matteuccia struthiopteris Keller and Brown 14.

Along the Delaware River at several points in northern New Jersey and at Crosswicks Creek on our northern boundary, where it was found by Mr. E. D. Sturtevant.*

ONOCLEA L.**Onoclea sensibilis** L. Sensitive Fern.

Onoclea sensibilis Linnæus, Sp. Pl. 1062. 1753 [Virginia].—Knieskern 41.—Britton 310.—Crawford, Barton I. 19. 1909.

Found throughout, except in the Pine Barrens; occurring in wet swamps, usually in shade.

Spores Mature.—Early October, apparently through autumn. Fertile fronds arise in early July, the pinnæ (which form berry-like bodies inclosing the sporangia) split open by early October and allow the sporangia to dehisce and the spores to escape.

Middle District.—Allaire (S), Pt. Pleasant (S), New Egypt, Hartford, Pemberton (NY), Birmingham, Arney's Mt. (S), Delaire, Medford (S), Sewell (S), Sicklerville (S), Swedesboro, Salem (S).

Coast Strip.—Manahawkin, Cox's, Surf City (L), Ship Bottom (L), Tucker's (L), Palermo (S).

Cape May.—Cape May (OHB).

Order EQUISETALES.

Rush-like plants with simple or much-branched jointed stems, leaves reduced to toothed sheaths covering the joints. Only three species occur within our district, none of them entering the Pine Barrens.

Family EQUISETACEÆ. Horsetails.

Fruiting Data.—The same character as for Filicales.

* According to Britton's Catalogue. No specimens seen.

*Key to the Species.**a. Stems smooth, annual.*

b. Cone-like spike containing the sporanges, on a separate plant, pale brown and without branches, appearing in spring and soon perishing. Sterile green plant with numerous branches becoming at least 75 mm. long. *E. arvense*, p. 138

bb. Cone-like spike at the tip of the stem of a green branched plant, branches fewer and variable, mostly less than 50 mm. long.

E. fluviatile, p. 138

aa. Stems harsh, stiff and evergreen, simple (very rarely branched).

E. hyemale affine, p. 138

EQUISETUM L.***Equisetum arvense* L. Field Horsetail.**

Equisetum arvense Linnæus, Sp. P. 1061. 1753 [Europe].—Knieskern 40.—Britton 312.

Frequent except in the Pine Barrens, but mostly as a weed along railroads, etc.

Spores Mature.—Early April to late April, more rarely to early May.

Middle District.—Farmingdale, New Egypt, Kirkwood, Delanco, Medford (S), Albion, Swedesboro (CDL).

Coast Strip.—Forked River, Barnegat City (L).

Cape May.—Dennisville (OHB), Court House, Anglesea Inc. (S), Cape May (OHB).

***Equisetum fluviatile* L. Swamp Horsetail.**

Equisetum fluviatile Linnæus, Sp. Pl. 1062. 1753 [Europe].

Equisetum limosum Britton, Cat. N. J. Plants 313.

Open wet swamps in north Jersey and occasional in the Middle district close to the Delaware River.

Spores Mature.—Mid-May to early June.

Middle District.—Delaire, Kaighns Pt., Gloucester.

***Equisetum hyemale affine* (Engelm.). Scouring Rush.**

Equisetum robustum affine Englemann, Amer. Jour. Sci. 46:88. 1844 [St. Louis, Mo.].

Equisetum hyemale Knieskern 40.—Britton 313.

**E. scirpoides* is given in Torrey's Catalogue 17, on the authority of Dr. Eddy, as occurring in the New Jersey Pine Barrens, but there must have been some mistake, as this species has never been found by anyone else.

North and Middle districts, usually appearing as if introduced.

Spores Mature.—Late May to late July, occasionally later in the summer. Undeveloped spikes persist throughout the year. Evergreen.

Middle District.—Keyport (C), Farmingdale (S), New Egypt, Delanco, Birmingham (C), Vincentown (C), Camden (P), Medford (S), Westville (KB), Woodstown (H).

Order LYCOPODIALES.

Includes the Club Mosses, Selaginellas and Quillworts. The last are mainly confined to the Delaware River and its immediate tributaries. Of the Club Mosses two species are characteristic of the Pine Barren bogs and found in practically all such situations in the district, while one other species is almost restricted to the Pines—*L. carolinianum*.

The other seven are for the most part intrusions from the north, only one of which occurs (sporadically) in the Pine Barren district. Our only *Selaginella* occurs in the Middle and Coast districts only.

Fruiting Data.—As in the ferns.

Key to the Species.

- a. Erect submerged plants consisting of a cluster of awl-shaped leaves arising from a fleshy bulb-like base. Sporangia concealed at the base of the leaves. *Isoetes*, p. 144
- aa. Small prostrate or assurgent moss-like plants, with sporanges at the axils of minute flat spreading leaves. *Selaginella apus*, p. 143
- aaa. Larger prostrate or erect plants with sporanges in the axils of the leaves in erect cylindrical spikes.
 - b. Plants normally erect, leaves all alike. *Lycopodium lucidulum*, p. 140
 - bb. Stems trailing, sending up erect branches, leaves all alike but top of spike, where the sporangia are born somewhat stouter.
 - c. Stems densely leafy, 15 mm. or terminal part 20 mm. in diameter. *L. alopecuroides*, p. 141
 - cc. Stems more slender.
 - d. .2—1 dm. high, central stem slender throughout. *L. inundatum*, p. 140
 - dd. 2.5—3 dm. high, decidedly more robust, central stem thicker terminally. *L. chapmanii*, p. 141
 - aaaa. Larger prostrate or erect plants with sporangia in the axils, of modified, yellowish, scale-like leaves which form a distinct slender cone-like spike.
 - b. Whole plant upright, branching. *L. obscurum*, p. 142

- bb. Plant with a prostrate creeping stem from which rise erect branches.
- c. Leaves linear subulate, not all strictly appressed.
 - d. Creeping stem, short, not more than .5 dm. in length, from which rises a slender stalk with minute appressed leaves and a single terminal spike. *L. carolinianum*, p. 142
 - dd. Creeping stem, 3-12 dm. long, with many erect or recumbent leafy branches, from some of which rise the slender fruit stalks, bearing one to four spikes each. *L. clavatum*, p. 143
- cc. Leaves minute, scale-like, imbricated and appressed on the flattened palmate branches, which rise from a similar creeping stem.
 - d. Trailing stem deep down below the surface, branches less than two millimeters wide. *L. tristachyum*, p. 143
 - dd. Trailing stem on the surface, branches two to four millimeters wide, more loosely forked. *L. flabelliforme*, p. 143

Family LYCOPODIACEÆ. Club Mosses.

LYCOPODIUM L.

Lycopodium lucidulum Michx. Shining Club-Moss.

Lycopodium lucidulum Michaux, Fl. Bor. Amer. II. 284. 1803 [Canada to Mountains of Carolina].—Britton 303.

Moist woods of North Jersey and locally in the Middle district.

Sporcs Mature.—Late July to mid-August; period of maturity brief. Evergreen.

Middle District.—New Egypt, Birmingham, Camden, Springdale (S), Medford (S), Woodbury, Swedesboro, Yorktown.

Lycopodium inundatum L. Bog Club-Moss.

Lycopodium inundatum Linnæus, Sp. Pl. 1102. 1753 [Europe].

Bogs of the northern counties and very rarely in the Middle district.

This species seem clearly distinct from the next, easily recognized by its slender stem and lower habit. Mr. W. A. Poyser tells me that he has specimens from Fairmount, Bergen County.

Middle District.—Kaighns Pt.

***Lycopodium chapmanii* Underwood. Chapman's Club-Moss.**

Pl. I., Fig. 2.

Lycopodium chapmanii "Underwood" Maxon, Proc. U. S. Nat. Mus. 23: 646.1901. n. n for *L. ind. adpressum* Chapman [Caloosa Riv., Florida].*Lycopodium inundatum* Gray, Manual Ed. I. 637. 1848.—Britton 303.*Lycopodium inundatum* var. *Bigelovii* Gray, Manual Ed. V. 673. 1867.

One of the most characteristic plants of the bogs of the Pine Barren region, occurring casually in the Middle, Coast, and Cape May districts.

Spores Mature.—Early August well into October.

Middle District.—Allaire (S), Farmingdale, Belmar (UP), Shark River, Center Square, Lindenwold, Orchard (S), Franklinville (UP), Union Grove (S), Dividing Creek.

Pine Barrens.—Lakehurst (UP), Chatsworth (UP), Clementon, Waterford, Cedar Brook, Ancora (UP), Atco (UP), Millville, Hammonton, Egg Harbor City, Absecon, Opposite Crowleystown.

Coast Strip.—Seaside Park, Forked River, Cox's, Harvey Cedars (L), Ship Bottom (L), Surf City (L), Spray Beach (UP), Peahala (L).

Cape May.—Bennett, Cold Spring (S).

***Lycopodium alopecuroides* L. Fox-tail Club-Moss.**

Pl. I., Fig. 1.

Lycopodium alopecuroides Linnæus, Sp. Pl. 1102. 1753 [Virginia, Canada].

—Willis 79.—Britton 303.

Lycopodium alopecoides Knieskern 41.

A characteristic Pine Barren bog species usually associated with the preceding. It reaches its northern limit in New Jersey, and occurs outside of the Pine Barrens only at Lawrence Station and a few localities in the Middle and Cape May districts.

Spores Mature.—Early September through October, even until killed by frost.

Middle District.—Hainesport, Kaighns Pt., Griffith's Swamp, Lindenwold, Swedesboro, Bridgeton, Dividing Creek.

Pine Barrens.—Toms River, Brown's Mills, South of New Egypt, Waretown, Pasadena, Chatsworth, Tomlinson's, Landisville, Hammonton, Pleasant Mills, Egg Harbor City.

Cape May.—Bennett (S), Cold Spring (S).

The characters usually cited for distinguishing the three preceding species are apparently not very constant and we certainly have a chain of connecting links in our New Jersey bogs between *L. chapmanii* and *L. alopecuroides*. As to *L. inundatum*, the

slender stem seems to separate all northern specimens that I have seen from *L. chapmanii* and the Kaighn's Pt. specimen is apparently the northern form. The old Kaighn's Pt. Swamp harbored a number of northern plants not found elsewhere so far south in the State. The application of the name *Bigelowii* is differently construed by different authors. It has usually been associated with *inundatum* as a variety.

***Lycopodium carolinianum* L. Carolina Club-Moss.**

Pl. I., Fig. 3.

Lycopodium carolinianum Linnæus, Sp. Pl. 1104. 1753 [Carolina].—Gray's Man. Ed. I. 638.—Knieskern 41.—Willis 80.—Britton 304.

This delicate little species, so frequently associated with *Schizæa*, is almost entirely restricted to the Pine Barrens, which mark the northern limit of its range. It is found in moist, sandy, open spots. It occurs with *Schizæa* at Mr. Bartram's locality near Seaside Park and has been found also at one station near Bennett by Mr. Long.

Spores Mature.—Late August well into November.

Pine Barrens.—Toms River (UP), Bamber, Waretown, West Creek (S), Chatsworth, Bear Swamp (S), Ballinger's Mill (S), Hammonton, Atsion, Quaker Bridge (Bassett), Batsto, opposite Crowleystown, Pleasant Mills, Egg Harbor City, Forked River, Absecon, Mays Landing (N. Y.).

Coast Strip.—Seaside Park.

Cape May.—Bennett.

***Lycopodium obscurum* L. Ground Pine.**

Lycopodium obscurum Linnæus, Sp. Pl. 1102. 1753 [Philadelphia, J. Bartram].—Britton 304.

Lycopodium dendroidum Barton, Fl. Phila. II. 203.—Knieskern 41.

A common woodland species of North Jersey and found less abundantly in the Middle, Coast, and Cape May districts, and at one locality in the Pines, possibly an intruder from the coast.

Spores Mature.—Apparently from late July to mid-August; fruits rather infrequently. Evergreen.

Middle District.—Farmingdale, New Egypt, New Lisbon (C), Birmingham, Moorestown (C), Fish House, Medford (S), Mickleton (H), Atco (C), Sicklerville, Glassboro, Swedesboro, Yorktown, Centerton (S).

Pine Barrens.—Hammonton (Bassett).

Coast Strip.—Cox's, Tuckerton.

Cape May.—Court House (S), Cold Spring (OHB).

Lycopodium flabelliforme (Fernald.). Trailing Christmas-green.

Lycopodium complanatum flabelliforme Fernald, Rhodora Nov. 1901, p. 280 [Maine].

Lycopodium complanatum Barton 203.—Knieskern 41.—Britton 304.

The common trailing species of the North Jersey woods extending casually to the Middle district and on the coast, even to the Cape May peninsula, but not known from the Pine Barrens.

Spores Mature.—Early August to mid-August; a very short period. Rather rarely fruiting in our range. Evergreen.

Middle District.—Farmingdale, New Egypt, Arneys Mt. (S), Fish House, Swedesboro.

Coast Strip.—Manahawkin.

Cape May.—Wildwood Jnc.

Lycopodium tristachyum Pursh. Glaucous Christmas-green.

Lycopodium tristachyum Pursh, Fl. Am. Sept. 653. 1814 [Sweet Springs, Mountains of Virginia].

Very rare in the Middle district and probably farther north in dry woods. Found at Shark River by Messrs. S. Brown and Norman Taylor, July 4, 1910, growing along a railroad bank and perhaps not native. Strobiles on the specimens somewhat immature.

Middle District.—Shark River.

Lycopodium clavatum L. Trailing Club-Moss.

Lycopodium clavatum Linnæus, Sp. Pl. 1101. 1753 [Europe].—Britton 304.—Keller and Brown 16.

Found in the woodlands of the northern counties, but known within our limits only from a very few stations in the Middle district.

Spores mature.—Fruiting specimens very rare, apparently. All seen from our range are sterile. Evergreen.

Middle District.—Bordentown, Ashland, Mickleton (C), near Millville (KB).

Family SELAGINELLACEÆ. Selaginellas.

SELAGINELLA Beauvois.

Selaginella apus (L.). Selaginella.

Lycopodium apus Linnæus, Sp. Pl. 1105. 1753 [Carolina, Virginia and Pennsylvania].

Selaginella apus Knieskern 41.—Britton 303.

Swampy ground in the North and Middle districts and down the coastal strip to Cape May, occurring among the roots of grasses and sedges or with sphagnum; especially abundant along the inner edge of the salt marshes.

Spores Mature.—Late June to early September. Semi-ever-green.

Middle District.—Farmingdale, Delanco, Mickleton (C), Center Sq. (H), Lindenwold, Sewell (S), Glassboro (S), Swedesboro.

Coast Strip.—Pt. Pleasant, Forked River, Cox's, Absecon (Bassett).

Cape May.—Court House (S), Cold Spring (S).

Family ISOETACEÆ. Quillworts.

ISOETES L.

The four species of *Isoetes* recorded from the Delaware River are given on the basis of specimens in the collection of Mr. W. A. Poyser, which were identified for him by Mr. A. A. Eaton; other specimens presumably identical are in the Academy collection. Mr. Poyser tells me further that *I. saccharata*, *riparia* and *echin. braunii* seemed to prefer the sand, but *canadensis* was in the coarse gravel. All were exposed at low tide. At Fish House *I. saccharata* intergraded with *I. riparia*, but at Delair was apparently growing alone. He sent Mr. Eaton abundant material from each locality, alive.

Outside of the Delaware River *Isoetes* seems rare in our district. Specimens from Camden Co. and Toms River are cited as identified in Britton's Catalogue. Besides these I have only seen specimens from Mays Landing; these are in the Academy herbarium and are supposed to be *I. riparia*. Specimens of *I. engelmanni* identified by Eaton from Assinpink Creek, just north of our limits, are in Mr. Poyser's collection.

Isoetes engelmanni A. Br. Engelmann's Quillwort.

Isoetes Engelmanni, A. Braun, Flora 29: 178. 1846 [St. Louis, Mo.].—Britton 302.—Keller and Brown 17.

Ponds and lakes of the northern counties and sparingly in Camden Co.

Middle District.—Camden (C)

Isoetes echinospora braunii (Durien). **Braun's Quillwort.**

Isoetes Braunii Durien, Bull. Soc. Bot. France XI: 101. 1864 [Lake Winnetoesaukee, N. H.].—Britton 302.—Keller and Brown 17.

Sparingly on the Delaware above Camden and at Toms River, also in ponds and lakes of the northern counties.

Middle District.—Toms River (P).

Isoetes canadensis (Engelm.). **Dodge's Quillwort.**

Isoetes riparia var. *Canadensis* Engelm., Trans. Acad. Sci., St. Louis, IV: 383. 1882 [Maine].

Isoetes Dodgei Keller and Brown 17.—Stone, Proc. Acad. Nat. Sci. 1908, 457.

Sparingly on the Delaware above Camden.

Middle District.—Fish House.

Isoetes saccharata Engelm. **Canby's Quillwort.**

Isoetes saccharata Engelm., Gray's Man. Ed. V: 676. 1867 [Wicomico River, Md.].

Sparingly on the Delaware above Camden. Originally discovered in Maryland by Wm. M. Canby.

Isoetes riparia Engelm. **Shore Quillwort.**

Isoetes riparia Engelm., A. Br. Flora 29: 178. 1846 [Shore of the Delaware, near Philadelphia].—Britton 302.—Keller and Brown 17.

Plentiful along the shores of the Delaware above Camden.

Middle District.—Camden (P).

SPERMATOPHYTA. Seed-bearing Plants.

Class GYMNOSPERMÆ.

Order PINALES.

A group of trees sharply separated from all others by their needle or scale-like (usually evergreen) leaves, resinous odor and cone-like fruit, modified in some species into a berry-like structure.

The Pitch Pine, Yellow Pine and White Cedar are the trees that give character to the Pine Barren district, while the Jersey Pine and Red Cedar are equally characteristic of the Middle

district, and the Old Field Pine of Cape May. The White Pine and Hemlock are rare intrusions from the north, and the Pond Pine and Cypress from the south.

Key to the Species.

- a. Seeds broadly winged, born in a typical cone, leaves evergreen.
 - b. Leaves needle-like, two to five together in a sheath.
 - c. Leaves in fives. *Pinus strobus*, p. 146
 - cc. Leaves in twos, short and somewhat twisted. *P. virginiana*, p. 147
 - ccc. Leaves in twos or threes, cone small, 25-50 mm. long, prickles weak. *P. echinata*, p. 147
 - cccc. Leaves in threes.
 - d. .7-1.2 dm. long, cone large and heavy, 16 mm. long, prickles strong. *P. rigida*, p. 148
 - dd. 1.5-2.5 dm. long.
 - e. Cone short and ovoid, less than .7 dm. long. *P. serotina*, p. 149
 - ee. Cone long, .7-1.2 dm. long. *P. taeda*, p. 150
 - bb. Leaves short and flat, not united in sheath. *Tsuga canadensis*, p. 150
- aa. Seeds in a spherical nut-like cone, leaves deciduous. *Taxodium distichum*, p. 151
- aaa. Seeds in a bluish, smooth or angled berry-like fruit.
 - b. Berry angular, persisting after opening as a brownish and woody nutlet. *Chamaecyparis thyoides*, p. 151
 - bb. Berry smooth and deciduous. *Juniperus virginianus*, p. 153

Family PINACEÆ. Conifers.

PINUS L.

Pinus strobus L. White Pine.

Pl. IV., Fig. 5.

Pinus strobus Linnæus, Sp. Pl. 1001. 1753 [Virginia and Canada].—Knieskern 29.—Willis 57.—Britton 301.

Originally, at least, a common forest tree of the northern counties, but occurring only sporadically in the Middle district and in no sense a characteristic species of our region.

Fl.—June (apparently). *Cones* mature in early autumn of the second season, commonly falling during the winter.

Middle District.—Pine Brook Station (C), Bordentown, Woodbury (C), Berlin (C), Swedesboro.

***Pinus virginiana* Mill. Jersey Pine.**

Pl. III., Fig. 3. Pl. IV., Fig. 6.

Pinus virginiana Miller, Gard. Dict. Ed. 8. No. 9. 1768 [Virginia].—Britton 300.*Pinus inops* Pursh 641.—Michaux Fl. Bor. Am. 11. 204.—Knieskern 29.—Willis 57—Gray Manual, Ed. I. 439.

This is the characteristic pine of the Middle district, especially in West Jersey, where it often forms dense patches of woodland.* It enters the Pine Barrens below Mays Landing and at Hammonton, apparently following the Batsto River and Egg Harbor River from the coast, where it is now very rare or absent. Mr. William T. Davis has also sent me a specimen from S. Lakehurst, but states that this locality is not typical Pine Barrens. To the northward it occurs at several stations just beyond our limits. As both *P. echinata* and *P. rigida* occur occasionally in the Middle district, it is possible to find all three growing side by side, as I have done at Medford, when their differences are rendered particularly striking.

Fl.—Late April to mid-May. *Cones* mature in autumn of the second season, and persist for several years.

Middle District.—Kinkora, Beverly, Arcola, Arney's Mt. (S), Pemberton (C), Springdale (S), Washington Park, Westville (UP), Mickleton, Swedesboro, Albion, Bridgeton.

Pine Barrens.—Hammonton (Bassett), Mays Landing (S), S. Lakehurst (S), (from Wm. T. Davis).

Cape May.—Cold Spring (S).

***Pinus echinata* Mill. Short-leaved Pine, Yellow Pine.**

Pl. III., Figs. 1 and 2. Pl. IV., Figs. 7 and 8.

Pinus echinata Miller, Gard. Dict. Ed. 8. No. 12. 1768. [Virginia].—Britton 301.*Pinus mitis* Knieskern 29.—Willis 57.—Gray Man. Ed. I. 440.

This species, while perhaps more plentiful in the Pine Barrens, occurs frequently in the Middle district as well as at South Amboy and in the Cape May peninsula. In some places, as at Brown's Mills, West Creek, Chatsworth, etc., it forms considerable groves.

* In the "Tree-Book" Miss Julia E. Rogers states that this is the pine of the New Jersey Pine Barrens. Where she received this quite erroneous impression, unless from the popular name of the species, I cannot imagine.

Fl.—Early May to late May. *Cones* mature in late summer of the second season and persist for several years.

Middle District.—Farmingdale, Allaire, New Egypt (C), Arney's Mt. (S), Brown's Mills, Medford (S), Lindenwold, Mickleton (KB), Clementon (S), Albion, Swedesboro, Centerton (S), Bridgeton (NB), Fairton (NB), Buckshutem.

Pine Barrens.—Forked River, Barnegat, Manahawkin, Inskip, Winslow Jnc., Hammonton (C), Quaker Bridge (S), Pleasant Mills, Mays Landing (S).

Cape May.—W. of Court House.

***Pinus rigida* Mill. Pitch Pine.**

Pl. II., Figs. 1 and 2 . Pl. IV., Figs. 3 and 4.

Pinus rigida Miller, Gard. Dict. Ed. 8, No. 10. 1768 [Virginia].—Knieskern 29.—Britton 300.

This is the common pine of the Pine Barrens. It occurs here and there in the North and Middle districts and there is a considerable grove on Absecon Beach, below Atlantic City. On the other island beaches, however, it is absent or very rare.

The Pitch Pine is *the* Pine of the New Jersey Barrens, and is largely restricted to them. Where a slight elevation of the sandy plain makes it possible for one to look out over the surrounding country, the pines extend in an unbroken sea of green clear to the horizon, and where it is only possible to see straight ahead they line the white, sandy trail with a green barrier on either side, stretching away until they seem to join together and swallow it up. In some places the pines reach a height of sixty feet and grow comparatively close together with bare trunks; again they are shorter, and scattered here and there over the white, shining sand, with branches all the way to the base; and on the so-called plains they are dwarfed and stunted with round boles half buried in the coarse sand and gravel, and prostrate branches seldom rising higher than a man's knee.

The pines lend a charm to this desolate country. In winter, when the wind is sighing through their branches and patches of snow here and there add to the whiteness of the sand, their evergreen foliage seems to warm the landscape, and their thick wall of branches offer shelter from the storm; and in summer the air of the pine land, rich with its resinous odor, seems dry.

clear and refreshing as compared with the humidity of the Delaware River country.

At all seasons there is a peculiar restfulness in these quiet stretches, over which the pines stand as silent sentinels.

And as day closes, and we pitch our camp among them, we see the light fading from their topmost branches, and the shadows deepening beneath them, while the dark limbs seem to stretch out and take the whole earth in their sheltering embrace.

Portions of the pine lands have been cut over again and again for charcoal, while fire rages through them year after year, and probably little absolutely virgin timber remains, but they seem to hold their own, and it is a frequent sight to see young pines coming up all over some deserted clearing. In some places, where the soil is perhaps richer, nearly solid oak woods have grown up where the pines have been cut, making a dense, almost impenetrable thicket, but it is a question whether even here the pines do not eventually prevail again. The opinions of natives on these points are often curiously at variance, and there is not as much reliable data on the subject as might be desired. The State reports, however, contain a great deal of information, especially the Forestry Reports appended to the Annual Report of the State Geologist for 1898 and 1899.

Fl.—Early May to late May. *Cones* mature in autumn of the second season and persist for quite a number of years.

Middle District.—Atlantic Heights (UP), Farmingdale (S), New Egypt, Arneys Mt. (S), Medford (S), Glassboro, Swedesboro.

Pine Barrens.—Landisville, West of Batsto, Cedar Bridge (UP), Egg Harbor City (UP).

Coast Strip.—Seaside Park (Ha), Sherburn's (L), Tuckerton, Barnegat City (L), Atlantic City (S), Piermont (S).

Cape May.—Cape May Pt.

***Pinus serotina* Michx. Pond Pine.**

Pl. III., Fig. 4. Pl. IV., Fig. 2.

Pinus serotina Michaux, F. Bor. Am. II. 205. 1803 [Cypress swamps of Carolina and Pennsylvania].—Long, Bartonian II., 17, 1910.

This southern species was first detected in New Jersey by Mr. Charles D. Lippincott, who many years ago recognized several trees growing near his home at Swedesboro as differing

materially from the familiar Pitch Pine, though Mr. Bayard Long, who visited the locality in 1909, was the first to identify them.

Almost simultaneously, Mr. O. H. Brown sent to the writer specimens from a tree at Town Bank, Cape May County, which seemed to him to differ from *Pinus rigida*, and they also proved to belong to the present species. Prior to this the Pond Pine was not known to occur north of Virginia. It will doubtless be found at other points in southwestern New Jersey.

Dr. John K. Small, of the New York Botanic Garden, kindly verified the identification of the Swedesboro trees.

Middle District.—Swedesboro.

Cape May.—Town Bank.

***Pinus tæda* L. Old-field Pine.**

Pl. II., Figs. 3 and 4. Pl. IV., Fig. 1.

Pinus Tæda Linnæus, Sp. Pl. 1000. 1753 [Virginia].—Keller and Brown 19.—Taylor, *Torreya* 1909, 205.—Pinchot, *Garden and Forest*, May 19, 1897.—Hollick, *Plant World* I., No. 2, Nov., 1897.—Hollick, *The Forester* III., 12, 1897.—Gifford, *The Forester* III., 6, June 1, 1897.—Long, *Bartonia* II., 17, 1910.

The Old Field Pine was first discovered in New Jersey by Mr. Gifford Pinchot, early in 1897, at Town Bank, Cape May County. Later in the same year Dr. Arthur Hollick made an unsuccessful effort to locate Mr. Pinchot's tree, but discovered another near Cold Spring School-house. Mr. O. H. Brown has subsequently discovered several others in the same neighborhood from which I have collected specimens.

Fl.—Mid-May to early June. *Cones* mature in autumn or winter of the second season and persist for a single season only.

Cape May.—Cold Spring, Dias Creek.

TSUGA Carriere.

***Tsuga canadensis* (L.). Hemlock.**

Pinus canadensis Linnæus, Sp. Pl. Ed. 2. 1421. 1763 [Virginia].
Abies canadensis Knieskern 29.
Tsuga canadensis Britton 301.

The Hemlock, a characteristic tree of the mountains of northern New Jersey, is only a straggler within our limits, occurring at some half-dozen stations in the Middle District.

Fl.—Mid-May to late May. *Cones* mature in early autumn of the first season and persist, in part at least, until the following spring.

Middle District.—Crosswicks Creek above New Egypt (NB), Bordentown, Burlington (C), Vincentown (NB), Swedesboro (KB), Sharpstown, Little Timber Creek near Gloucester (P).

TAXODIUM L. C. Rich.

Taxodium distichum (L.) Bald Cypress.

Cupressus disticha Linnæus, Sp. Pl. 1003. 1753 [Virginia and Carolina].—Beck, Bot. 338, 1833.—Gray, Manual Ed. 1, 443, 1848.—Hollick, Rep. on Forests, 181, 1900.

Upon what evidence the Cypress was credited to New Jersey by Beck and Gray I am unable to say, but more recent works have pretty generally excluded our State from its range, or added it with doubt. Search for it in the swamps of South Jersey failed until Mr. H. Walker Hand pointed out a single tree on the edge of Sluice Creek, not far from Dennisville, and informed me of another that formerly grew further down the stream toward the bay. The suggestion has been made that these trees were brought from farther south and planted here, but we can find no positive evidence of this, while very old residents remember them as being large trees in their youth. The locality is peculiarly suitable for Cypress, and, judging by the number of southern plants that have been discovered on the bay side of Cape May County, the occurrence of the Cypress is by no means remarkable. Dr. Arthur Hollick mentions several trees on the salt marsh near Newark, north of our limits, which were also alleged to have been introduced, but proof of the fact was not obtainable, while conditions were just such as prevail in the natural habitat of the species. This is the only other occurrence of the tree in an apparently natural condition in the State.

Cones.—Immature August 6.

Cape May.—S. Dennis.

CHAMÆCYPARIS Spach.

Chamæcyparis thyoides (L.). White Cedar.

Cupressus thyoides Linnæus, Sp. Pl. 1003. 1753 [Canada].—Muhlenberg Cat. 89.—Knieskern 29.—Willis 58.—Britton 299.

Next to the Pitch Pine, this is the most characteristic tree of the Pine Barrens, following the courses of all the streams and spreading out in many places to form immense cedar swamps. Outside of the Pine Barrens, it occurs casually in the Middle district, the Cape May peninsula and in the counties just north of our limits, while a colony is also reported from the shore of Greenwood Lake.

In the primæval Cedar Swamps the straight trunks rise on every side like telegraph poles, which many of them resemble both in height and diameter. Their roots are covered with masses of wet Sphagnum moss, and numerous shrubs and herbs more or less peculiar to these dark retreats abound. The tops are closely interlaced in a dense canopy which nearly excludes the sunlight, and where one has an opportunity of surveying the landscape the courses of the streams can always be traced by the dark blue-green lines of pointed cedar tops which stand out against the lighter green background of the pines. The bluish berry-like cones, when still covered with the whitish bloom that marks their early stages of growth, are sometimes very conspicuous as the light strikes them, and I recall one occasion in particular on the eve of a heavy thunder storm, when the edge of a cedar swamp stood out in relief against an almost black sky and the masses of fruit on the topmost branches shown in the peculiar clear light with the gleam of silver against the deep-green foliage. Unfortunately the portable saw-mill is sounding the doom of the Cedar Swamps, and piles of yellow sawdust now mark many a site where a few years ago stretched one of these dark retreats. If fire can be kept out and draining discouraged, the cedars will probably grow again; indeed in some swamps that have been completely burned over the young cedars, after a lapse of a few years, may be seen rising everywhere among the bare poles left by the flames. Draining or damming for cranberry bogs proves fatal to them, however, and many of the old swamps are probably gone forever.

Fl.—Early April to mid-April. *Cones* mature in late summer of the first season and persist for a year at least.

Middle District.—Camden, Sicklerville (S), Glassboro, Swedesboro, Centerton (S), Beaver Dam (S), Dividing Creek.

Pine Barrens.—Pt. Pleasant, Manchester (NB), Albion, Clementon, Waretown, Forked River.

Coast Strip.—Seaside Park (S).

JUNIPERUS L.

Juniperus virginiana L.* Red Cedar.

Juniperus virginiana Linnæus, Sp. Pl. 1039. 1753 [Virginia].—Kalm, Travels 360.—Knieskern 29.—Britton 300.

A common tree in dry sandy localities in northern New Jersey and in the Middle district, the Red Cedar is particularly characteristic of the coastal strip and the coast islands, and nowhere have I seen it fruit more abundantly. In the Pine Barrens it is found only in cultivated areas, where it has been obviously introduced.

Fl.—Mid-March to early April with the first warm spring days, from buds formed the previous summer. *Fruit* matures in early autumn, persisting more or less through the winter.

Middle District.—Navesink Highlands (UP), Birmingham, Albion, Hadonfield (UP), Sharpstown, Beaver Dam (S).

Coast Strip.—Seaside Park (Ha), Forked River, Surf City (L), Ship Bottom (L), St. Albans (L), Barnegat City (L), Atlantic City (S), Palermo, Mays Landing (S), Anglesea (UP).

Cape May.—South Dennis (S), Goshen (S), Court House, Cape May.

Class ANGIOSPERMÆ.

Sub-class MONOCOTYLEDONES.

Key to the Genera.

(Except *Gramineæ* and *Cyperaceæ* q. v.)

a. Flowers inclosed or spikes of flowers surrounded by imbricated husk-like scales (glumes); plants grass-like.

b. Stems hollow, round or flattened, anthers attached by the middle.

Gramineæ, p. 174

bb. Stems solid, more or less triangular, anthers attached at the base.

Cyperaceæ, p. 246

* While the Juniper (*J. communis* Linn, Sp. Pl. 1040. 1753.—N. Europe) is found at several localities in the northern counties, its claim to a place in this list is based solely upon Torrey's statement to Willis, that it is found rarely in Monmouth Co. I have seen no specimen.

aa. Flowers not inclosed, in husk-like glumes.

b. Aquatic plants, entirely submerged or with some of the leaves floating on the surface.

c. Plant a minute floating disc with several roots below or a minute floating globule. *Lemnaceæ*, p. 318

cc. Stems branched and leafy, leaves long and grass-like or ovate.

d. Flowers inconspicuous, axillary or in short spikes.

Najadaceæ, p. 160

dd. Flowers star-like, yellow, raised above the surface on slender pedicels. *Heteranthera dubia*, p. 327

ccc. Stems mostly simple, leaves short, linear, whorled.

Philotria, p. 173

cccc. All leaves from the root, long and ribbon-like, flowers on separate thread-like scapes. *Vallisneria*, p. 173

çcccc. Leaves basal in an erect tuft, lanceolate, flat or awl-shaped, flowers projecting above the surface.

d. Flowers showy, white, in a spike remotely whorled.

Sagittaria, p. 169

dd. Flowers minute, forming a compact button-like head.

Eriocaulon, p. 323

bb. Erect plants, growing in water, swamps or dry ground.

c. Flowers regular.

d. Leaves whorled or palmately divided.

e. Leaves in one whorl of three, flowers solitary.

Trillium, p. 350

ee. Leaves in two whorls of more than three, flowers several. *Medeola*, p. 350

eee. Leaves in many whorls, flowers large, red or orange.

Lilium, p. 345

cccc. Leaves one or two, palmately divided.

Arisæma, p. 314

dd. Leaves not whorled or palmately divided.

e. Leaves all radical.

f. Leaves sagittate.

g. Flowers white, in a remotely whorled spike. *Sagittaria*, p. 169

gg. Flowers blue, in a compact spike.

Pontederia, p. 327

ggg. Flowers minute, on a fleshy spadix, incased in a convolute spathe.

Peltandra, p. 315

ff. Leaves oval, ovate, etc. (at least 25 mm. wide).

g. Leaves numerous.

h. Flowers minute, on a fleshy spadix, no parianth.

i. Spadix covered by a hood-like spathe, appearing before the large cabbage-like leaves.

Spathyema, p. 316

- ii. Spadix naked, bright yellow, raised above the water on a thick scape, leaves usually floating. *Orontium*, p. 317
- hh. Flowers with a perianth, mostly showy.
 - i. Flowers in a large whorled panicle, small, white. *Alisma*, p. 168
 - ii. Flowers in a remotely whorled spike, large, white. *Sagittaria*, p. 169
 - iii. Flowers in a dense spike, lilac with blue anthers. *Helonias*, p. 340
- gg. Leaves only two.
 - h. Flowers single, lily-like, yellow, leaves spotted. *Erythronium*, p. 346
 - hh. Flowers white, in an umbel, plant garlic scented, leaves absent at flowering time. *Allium tricoccum*, p. 344
- fff. Leaves grass-like or long linear (never as much as 25 mm. wide).
 - g. Flowers in a remotely whorled spike or an umbel. *Alismaceæ*, p. 168
 - gg. Flowers in a slender continuous spike.
 - h. Leaves slender, grass-like, erect, flowers minute (spike resembling that of a plantain). *Triglochin*, p. 166
 - hh. Leaves lanceolate spatulate, forming a rosette, flowers white, bell-shaped, mealy. *Aletris*, p. 347
 - ggg. Flowers in a globular compact head.
 - h. Head white, button-like, flowers minute. *Eriocaulon*, p. 323
 - hh. Head of imbricated brown scales, flowers protruding, conspicuous, yellow. *Xyris*, p. 319
 - gggg. Flowers conspicuous, star-shaped, in an open panicle.
 - h. Flowers white, leaves glabrous. [*Ornithogalum umbellatum*]*
 - hh. Flowers yellow, leaves hairy. *Hypoxis*, p. 355

* Star-of-Bethlehem, introducer in meadows.

- ggggg. Flowers inconspicuous, in an open panicle, scattered singly or clustered in heads (panicle sometimes congested), green or brownish. Leaves grass-like or awl-shaped and whole plant resembling a sedge. *Juncaceæ*, p. 328
- ce. Leaves cauline.
- f. Leaves oval, ovate, etc. (at least 25 mm. wide).
- g. Flowers green, in a large open panicle. *Veratrum*, p. 342
- gg. Flowers white, small, star-shaped.
- h. In a dense slender spike. *Chamaelirium*, p. 341
- hh. In a compact terminal panicle.
- i. Parts in six. *Vagnera*, p. 348
- ii. Parts in four. *Unifolium*, p. 349
- ggg. Flowers white or yellow, bell-shaped.
- h. Single yellow. *Uvularia*, p. 343
- hh. In umbels, white *Polygonatum*, p. 349
- ff. Leaves sagittate, flowers blue. *Pontederia*, p. 327
- fff. Leaves uniform, flowers small, from a leafy spathe. *Heteranthera reniformis*, p. 327
- ffff. Leaves grass-like or long linear, sword-like (never as much as 25 mm. wide).
- g. Flowers without a perianth, very minute.
- h. Flowers in dense terminal spikes (cattails). *Typha*, p. 158
- hh. Flowers globular umbels of stamens or pistils. *Sparganium*, p. 159
- hhh. Flowers in a slender dense spike (a spadix) on the side of a flat leafy scape. *Acorus*, p. 317
- gg. Flowers with conspicuous perianth.
- h. Flowers in a spike.
- i. Yellow with chaffy bracts. *Abama*, p. 338
- ii. White or greenish-white.
- j. Stem glutinous. *Tofieldia*, p. 337
- jj. Stem not glutinous.
- k. Leaves grass-like, harsh, in a dense tuft. *Xerophyllum*, p. 339
- kk. Leaves linear, 18 mm. broad, smooth. *Chrosperma*, p. 341
- hh. Flowers in an umbel or solitary.
- i. Sepals green, petals blue. *Tradescantia*, p. 325

ii. Sepals blue, like the petals.

Iridaceæ, p. 358

iii. Flowers whitish or purple, odor of garlic.

Allium, p. 344

hhh. Flowers in large open panicle or branched spike.

Melanthium, p. 342

or *Zygadenus*, p. 342

hhhh. Flowers in a moderate panicle; flowers white, woolly.

Lophiola and *Gyrotheca*, pp. 355, 354

ggg. Flowers with inconspicuous perianth, green or brownish, in an open (or congested) panicle; scattered singly or clustered in heads. Leaves grass-like or awl-shaped, and whole plant resembling a sedge.

Juncus and *Scheuchzeria*, pp. 328, 167

cc. Flowers irregular.

d. Flowers slightly irregular, lateral petals larger than lower one. Included in a folded leaf-like bract. Stamens three.

Commelina, p. 326

dd. Flowers markedly irregular, lower petal modified into a more or less elaborate lip, lateral petals much smaller, sepals slender and alike.

Orchidaceæ, p. 361

bbb. Vines (or upright herbs with tendrils), flowers greenish.

c. Flowers in umbels, stems often woody and armed with spines, fruit a berry.

Smilax, p. 351

cc. Flowers in panicles or racemes, fruit winged.

Dioscorea, p. 357

Order PANDANALES.

Comprises the Cat-tails and Bur-reeds. The former mainly restricted to the coast and river marshes, the latter to inland or coast swamps and streams.

Family TYPHACEÆ. Cat-tails.

Key to the Species.

- a. Leaves often nearly or quite an inch in width, staminate and pistillate portions of the spike contiguous, the former soon withering, but its stalk remaining at the end of the pistillate spike. *Typha latifolia*, p. 158
- aa. Leaves not over half an inch in width, staminate spike separated by a short intervals from the pistillate. *T. angustifolia*, p. 158

TYPHA L.

***Typha latifolia* L. Broad-leaved Cat-tail.**

Typha latifolia Linnæus, Sp. Pl. 971. 1753 [Europe].—Muhlenberg Gramineæ 213.—Knieskern 30.—Britton 251.

Swamps along the coast or borders of rivers and less frequently in isolated swamps in the interior; rare in the Pine Barrens, where it always seems to spring up in burned swamps, or excavations, usually disappearing later.

Fl.—Mid-June to late June. *Fr.*—Mid-July to late August.

Middle District.—Farmingdale, Swedesboro, Mickleton (H).

Coast Strip.—Forked River, Beach Haven Terrace (L).

Pine Barrens.—Wildwood, Egg Harbor City.

Cape May.—S. Dennis (S), Goshen (S).

***Typha angustifolia* L. Narrow-leaved or Coast Cat-tail.**

Typha angustifolia Linnæus, Sp. Pl. 971. 1753 [Europe].—Muhlenberg Gramineæ 213.—Knieskern 30.—Barton II. 149.—Britton 252.

Distribution similar to the last, but much more plentiful along salt or brackish water and rare in the northern counties.

The Coast Cat-tail cover large areas of coastal and river marsh, forming safe retreat and shelter for many swamp-loving birds. Sometimes the growth is almost pure, in other places it is mixed with the Broad-leaved Cat-tail, or skirted by Rose Mallow, Wild Rice, etc., while here and there patches of Reed (*Phragmites*) are interspersed.

In summer the slender, erect, green leaves swaying in unison, rank upon rank, seem to be constantly changing their tone as they reflect the light and shadows from the sun and the passing clouds, while the effect produced by a stray breeze is like great billows traversing a broad green sea. In winter the yellow stalks and dry leaves rattling in the bleak wind still furnish shelter for the birds and present a warm spot in the otherwise dreary landscape. And with every attempt to push one's way through them clouds of the downy seeds are dislodged and go whirling away on the wind or cover the intruder until he appears literally "tarred and feathered."

Fl.—Early June to mid-June. *Fr.*—Mid-July to late August.

Middle District.—Farmingdale, New Egypt, Pemberton (C), Gloucester (UP), Beaver Dam.

Coast Strip.—Sandy Hook, Sea Girt (UP), Como (UP), Pt. Pleasant, Seaside Park (UP), N. Beach Haven (L), Holgate's (L), Sherburn's (L), Anglesea, Wildwood, Pleasant Mills.

Cape May.—S. Dennis (S), Sluice Creek (S), Cape May (S).

Family SPARGANIACEÆ. Bur-reeds.

Flowering and Fruiting Data.—The time of fruiting indicates the season of fully developed intact fruiting heads. The Flowers appear in June and July.

SPARGANIUM L.

Key to the Species.

- a. Individual seeds sessile in the head. *S. eurycarpum*, p. 159
- aa. Individual seeds stalked in the head.
 - b. Inflorescence, simple. *S. americanum*, p. 159
 - bb. Inflorescence, branched, *S. a. androcladum*, p. 160

Sparganium eurycarpum Engelm. Large Bur-reed.

Sparganium eurycarpum Engelm., in Gray's Manual Ed. 2. 430. 1856 [U. S. northward and westward].—Britton 252.

Sparganium ramosum Barton, Fl. Phila. II. 149. 1818.

Northern counties, extending casually to the Middle district in swamps along the Delaware and coast.

Fl.—June and July. *Fr.*—Mid-July to mid-September.

Middle District.—Delair, Camden.

Coast Strip.—Lake Como.

Sparganium americanum Nutt. Slender Bur-reed.

Sparganium americanum Nuttall, Gen. II. 203. 1818 [Vicinity of Philadelphia].

Swamps in the Pine Barrens, possibly more widely distributed.

Fl.—June-July. *Fr.*—Late July to late September.

While often erect, as is usual with the succeeding, this form is often found floating in the more rapid Pine Barren streams, the leaves being considerably elongated, but not as markedly so as in *S. fluctuans* of the north.

Pine Barrens.—Forked River, Bamber, Tuckerton, Parkdale (S), Bear Swamp (S), Clementon.

Sparganium americanum androcladum (Engelm.). **Branching Bur-reed.**

Sparganium simplex var *androcladum* Engelmann, in Gray's Manual Ed. 5.

481. 1867 [N. England southward especially westward].

Sparganium simplex Knieskern 30.—Barton II. 149.

Sparganium androcladum Britton 252.

In swamps common throughout, except in the Pine Barrens, where it is largely replaced by the preceding.

Fl.—June, July. *Fr.*—Mid-July to late September.

Middle District.—Toms River (P), Farmingdale, New Egypt, Kinkora (NY), Tomlin (S), Swedesboro.

Pine Barrens.—Parkdale, Bear Swamp (S), Cedar Brook, Clementon (S), Winslow (S), Landisville, Twelfth St., Egg Harbor City, Manumuskin (S).

Cape May.—Cold Spring.

Order NAJADALES.

Floating or erect aquatic or swamp plants, including the Pond weeds, Arrow-heads, etc., generally distributed throughout our region.

Family NAJADACEÆ. Pondweeds, Etc.

The Pondweeds occur in most of the ponds and streams of our region often mingled in great masses with *Utricularias*, *Ceratophyllum* and other water plants. Most of the species can be recognized by the oval floating leaves, so different from the thin, usually grass-like submerged foliage, but others are entirely submerged and only to be identified by their fruit or minute flowers. The eel grass of the coast is a rather distinct and familiar species.

Flowering and Fruiting Data.—Dates indicate period of mature fruit. Flowers appear in late spring through the summer.

Key to the Species.

a. Stem and leaves very slender, capillary or linear.

b. Fruit, 2-6 in a cluster, sessile or slightly pedicelled, 2-4 mm. long, slender, curved and beaked. Leaves 25-75 mm. long.

Zanichellia palustris, p. 165

bb. Fruit, 5-7 in an umbel on a pedicel, often spirally twisted; 2 mm. long, ovoid, beaked. Leaves 25-75 mm. long.

Ruppia maritima, p. 165

bbb. Fruit, solitary, sessile, ellipsoid.

- c. Leaves crowded on the branches 12-25 mm. long. 1-2 mm. wide.
Najas flexilis, p. 165
- cc. Leaves capillary opposite or in whorls 12-50 mm. long.
Najas gracillima, p. 166
- bbbb. Fruit sessile in a cluster or short spike borne on a common peduncle or rarely sessile.
- c. Stem much branched above, the branches continually forking; fruits smooth and plump, in an elongated spike.
- d. Fruit 2-3 mm. long in a compact spike.
Platamogeton confervoides, p. 163
- dd. Fruit 3-4 mm. long in an interrupted spike, in whorls.
P. pectinatus, p. 164
- cc. Stem densely dichotomously branched above.
- d. Fruit smooth and plump, in a cluster of 3-10, about 2 mm. long.
P. pusillus, p. 164
- dd. Fruit flattened with a prominent spiral ridge on the side (sometimes with oval floating leaves and pedicelled spikes projecting from the surface).
- c. Submerged spikes sessile, 1-10 fruited, fruit less than 2 mm. in diameter.
P. dimorphus, p. 164
- ee. Submerged spikes, short pedicelled, 1 mm. in diameter.
P. diversifolius, p. 164
- aa. Leaves ovate, elliptical or oblong lanceolate. Fruits in a dense spike, supported on a peduncle.
- b. All submerged.
- c. Cordate clasping or perfoliate.
P. perfoliatus, p. 163
- cc. Sessile, with margins finely serrulate and crisped.
[*P. crispus*]*
- bb. Some leaves floating petioled thicker and more coriaceous than the thin submerged leaves.
- c. Floating leaves ovate or round ovate, 50-100×30-50 mm.
- d. Submerged leaves large elliptic.
P. amplifolius, p. 162
- dd. Submerged leaves lanceolate, acuminate.
P. pulcher, p. 162
- cc. Floating leaves 12-30 mm. wide. Elliptic or obovate.
- d. 25-50 mm.; submerged leaves capillary, root like.
P. oakesianus, p. 162
- dd. 35-85 mm. long, somewhat obovate, obtuse; submerged leaves linear, closely ranked, 5-15 cm. long.
P. epihydrus, p. 162
- ddd. 50-150 mm. long, pointed at each end; submerged leaves lanceolate acuminate 10-30 cm. long.
P. americanus, p. 163
- ccc. Floating leaves elliptic obtuse, not over 25×12 mm., usually one-third less. Submerged leaves narrowly linear grass-like.
- d. Submerged fruit clusters sessile.
P. dimorphus, p. 164
- dd. Submerged fruit spikes short pedicelled.
P. diversifolius, p. 164

* Introduced in ponds and ditches.

aaa. Leaves ribbon-like, obtuse at the apex, 3-18 dm. long, 2-8 mm. wide, all submerged, branching marine plants from bays, etc., along the coast.

Zostera marina, p. 166

POTAMOGETON L.

Potamogeton oakeslanus Robbins.* **Oakes' Pondweed.**

Potamogeton oakesianus Robbins, in Gray's Manual, Ed. 5. 485. 1867 [Eastern Massachusetts].—Gross, Bull. Torrey Bot. Club XI. 32. 1884.—Britton 257.—Keller and Brown 22.

Ponds in the Pine Barrens and Cape May peninsula and at Tenafly, Bergen Co. (Britton); apparently rare.

Fr.—Apparently mid-July to mid-September.

Pine Barrens.—Browns Mills (NB), Hospitality Br. 12th St., Estelville (NB), Folsom, Mays Landing (T).

Cape May.—Dennisville (OHB), Town Bank (OHB).

Potamogeton amplifolius Tuckerm. **Leafy Pondweed.**

Potamogeton amplifolius Tuckerman, Am. Jour. Sci. (II.) 6. 225. 1848 [Cambridge, Mass.].—Britton 257.—Keller and Brown 22.

Ponds and rivers of northern New Jersey extending into the Middle district along the Delaware.

Middle District.—Cooper's Creek, Burlington.

Potamogeton pulcher Tuckerm. **Spotted Pondweed.**

Potamogeton pulcher Tuckerman, Am. Jour. Sci. XLV. 38. 1843 [Medford and Stoneham, Mass.].—Willis 60.—Britton 257.—Keller and Brown 22.

Ponds and streams of the Middle and Coast districts to Cape May.

Fr.—Late June to late July (apparently).

Middle District.—Repaupo, Center Square, Elmer (P).

Coast Strip.—Toms River (C), Atlantic City, Anglesea.

Cape May.—Cape May, Cold Spring.

Potamogeton epihydrus Raf. **Nuttall's Pondweed.**

Potamogeton epihydrus Rafinesque, Med. Repos. II. 5. 354. 1808. [Canada].

Potamogeton Pennsylvanicus Britton 257.

Potamogeton nuttallii Keller and Brown 22.

* *P. natans*, reported as common throughout by Britton and by Keller & Brown, I have been unable to find in southern New Jersey, nor have I seen specimens from within our limits.

Ponds and streams throughout the State, the commonest large-leaved Pondweed of our region.

Fr.—Late June to early September.

Middle District.—Farmingdale, Vincentown (NB), Kirkwood (Bassett), Paulsboro, Buckshutem, Swedesboro.

Pine Barrens.—Bamber, Quaker Bridge, Clementon.

Coast Strip.—Long Branch, Manasquan (NB), Forked River, Manahawkin.

Cape May.—Cape May (OHB), Cold Spring.

Potamogeton americanus Cham. and Schlecht.* **Long-leaved Pondweed.**

Potamogeton americanus Chamisso and Schlechtendahl, Linnæa II. 226. 1827 [Carolina].

Potamogeton fluitans Pursh, Fl. Am. Sept. I. 120. 1814.—Britton 257.

Potamogeton lonchitis Keller and Brown 22.

Northern counties and Middle district, not very common.

Middle District.—New Egypt (NY), Repaupo, Swedesboro, Salem (C).

Potamogeton perfoliatus L. **Clasping-leaved Pondweed.**

Potamogeton perfoliatus Linnæus, Sp. Pl. 126. 1753 [Europe].—Britton 258.

Reported as occurring in ponds throughout the State, but we have no evidence of its presence in the Pine Barrens.

Fr.—Well matured September 17.

Middle District.—Westville.

Coast Strip.—Bayhead (McKenzie), Island Heights Jnc., Silver Lake near Belmar, Takanassee Lake (Elberon?) (UP).

Potamogeton confervoides Reichb. **Alga-like Pondweed.**

Potamogeton confervoides Reichenbach, Ic. Fl. Germ. and Helv. VII. 13. 1845 [Allegheny Mts.].—Keller and Brown 23.

Potamogeton tuckermani Willis 60.—Britton 258.

Restricted to ponds and streams in the Pine Barrens and does not occur in New Jersey north of our limits.

Fr.—Late June into September.

Pine Barrens.—Toms River, Browns Mills, Bamber, Island Heights Jnc., Forked River, Ten miles W. of Atlantic City, Absecon (P), Tuckerton, Atco, Landisville (T), Malaga (P), Hammonton, Atsion (C), Pleasant Mills, Spring Garden (UP).

* *P. heterophyllus* Schreb. seems to be restricted to the northern part of the State. One non-fruitle specimen from the Batsto river collected Sept. 14, 1861, by Wm. Wynne Wister, and now in the Philadelphia Academy herbarium, has been referred to this species, but it cannot be identified with certainty.

Potamogeton pusillus L.* Small Pondweed.

Potamogeton pusillum Linnaeus, Sp. Pl. 127. 1753 [Europe].—Britton 258.

Similar situations to the next, but apparently less common.

Middle District.—Kaighns Pt. (NB), Swedesboro, Woodstown.

Cape May.—Cape May Pt. (OHB).

Potamogeton diversifolius Raf. Rafinesque's Pondweed.

Potamogeton diversifolius Rafinesque, Med. Repos. (II.) V. 354. 1808 [Carolina].—Barton, Flor. Phil. 96, 1818.—Torrey, Flor. U. S. I. 197. 1824.—Brown and Keller 23.

Potamogeton setaceum Pursh, Fl. Am. Sept. I. 120, 1814.

Potamogeton hybridus Britton 257.

Ponds and streams throughout the State except in the Pine Barrens.

Fr.—Early July into September.

Middle District.—Ocean Grove (UP), Delanco, Brown's Mills (UP). Center Square, Landisville.

Coast Strip.—Manahawkin.

Cape May.—Dennisville (OHB), Bennett, Cape May (OHB).

Potamogeton dimorphus Raf. Spiral Pondweed.

Potamogeton dimorphus Rafinesque, Am. Mo. Mag. I. 358. 1817 [Pennsylvania].

Potamogeton spirillus Britton 257.—Keller and Brown 23.

Northern New Jersey, extending into the Middle district along the Delaware river.

Fr.—Late June into August.

Middle District.—Fish House, Westville (KB).

Potamogeton pectinatus L. Fennel-leaved Pondweed.

Potamogeton pectinatus Linnaeus, Sp. Pl. 127. 1753 [Europe].—Torrey, Fl. U. S. I. 198, 1824.—Britton 258.

* The Woodstown specimen referred to by Keller and Brown as *P. foliosus* proves to be *P. pusillus*.

† We find no evidence of the occurrence of *P. robbinsii* within the limits of our list, although it occurs in the northern counties. *P. pectinatus* is given as occurring in Monmouth Co. in Willis' Catalogue on Torrey's authority, but there is no specimen from this locality extant. The records given for the two species by Keller and Brown at Island Heights and Pleasant Mills, respectively, are based upon specimens in the Academy herbarium, which prove to be *P. confervoides*.

Northern counties, and rare southward along the coast.

Coast Strip.—Island Heights (NY), Sherburn's (L), Long Beach.

RUPPIA L.

Ruppia maritima L. *Ruppia*.

Ruppia maritima Linnæus, Sp. Pl. 127. 1753 [Coast of Europe].—Knieskern 30.—Willis 59.—Beck's Bot. 385, 1833.—Britton 259.—Keller and Brown 23.

Frequent in bays and pools along the coast. Its occurrence on the Delaware Bay shore is probable, but not substantiated by specimens.

Fr.—Mid-July to mid-October.

Maritime.—Deal Beach, Seaside Park (Ha), Island Heights, Half Way House south of Bond's (L), St. Albans (L), Anchoring Island (L), Atlantic City, Somer's Point, Stone Harbor, Cold Spring, Cape May Pt., Cape May (P).

ZANNICHELLIA L.

Zannichellia palustris L. *Zannichellia*.

Zannichellia palustris Linnæus, Sp. Pl. 969. 1753 [Europe and Virginia].—Britton 259.—Keller and Brown 24.

In 1889 this plant was known only from a locality in Bergen County. In 1896 it was discovered at Forked River by Mr. Albrecht Jahn and other members of the Philadelphia Botanical Club, and later Mr. Bayard Long extended its range southward to Long Beach. Mr. Stewardson Brown tells me that he is sure that he found it in the Manasquan River at Point Pleasant, about 1885, but no specimens are preserved.

Fr.—Early June to mid-October.

Coast Strip.—Forked River, Beach Haven (L), Holgate's (L), Sherburn's (L).

NAJAS L.

Najas flexilis (Willd.). *Water Nymph*.

Caulinia flexilis Willdenow, Mem. Acad. Berl. 1798:89 (1801) [Pennsylvania].

Naias flexilis Britton 259.

Lakes and ponds frequent in the northern counties and extending as a rare species into the Middle and upper coast districts, but apparently absent from the Pine Barrens.

Fr.—August and September (at least).

166 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—Camden, mouth of Cooper's Creek (UP). Westville, Repaupo (H), Mickleton (H), Salem.

Coast Strip.—Takanassee Lake (Elberon?) (UP), Silver Lake, Belmar.

Najas gracillima (A. Br.). Slender Water Nymph.

Nais Indica var. *gracillima* "A. Br." Engelm. in A. Gray Man., Ed. 5. 681. 1867 [Albany, N. Y., Woburn, Mass., and Missouri].—Britton 259.

Apparently restricted to ponds and creeks of western New Jersey.

Fr.—Mid-July into September.

Middle District.—Delanco, Mouth of Cooper's Creek, Palatine, Woodstown (NB).

ZOSTERA L.

Zostera marina L. Eel Grass.

Zostera marina Linnæus, Sp. Pl. 968. 1753 [Baltic Sea and Atlantic Ocean].—Nuttall Genera II. 201, 1818.—Knieskern 30.—Willis 59.—Britton 259.—Keller and Brown 24.

Common in bays all along the coast. Information is lacking as to its occurrence on the Delaware Bay shore. The long ribbon-like leaves are washed up on the shores of the bays and on the salt marshes in large masses, termed "Grass-wrack" by the fishermen. Of late years this is carefully dried and shipped to manufacturers of glassware, etc., to be used as packing.

Fl. and *Fr.*—Seen only during June.

Maritime.—Seaside Park (S), Spray Beach (L), N. Beach Haven (L), Beach Haven Terrace (L), Tucker's (L), Atlantic City (H), Ocean City (S), Cape May (P).

Family SCHEUCHZERIACEÆ. Arrow-grass, Etc.

Key to the Species.

- a. Leaves all basal, flowers in a terminal spike. *Triglochin*, p. 166
- aa. Leaves scattered on the stem, flowers in a loose raceme. *Scheuchzeria*, p. 167

TRIGLOCHIN L.

Triglochin maritima L. Seaside Arrowgrass.

Triglochin maritima Linnæus, Sp. Pl. 339. 1753 [Coast of Europe].—Willis 60.—Britton 256.—Keller and Brown 24.

Edge of salt marshes in Monmouth and Ocean Counties. I am not aware of the exact locality in Monmouth County from

which the specimens recorded in Willis' list came, nor do I know the name of their discoverer.

In July, 1902, however, on an excursion of the Philadelphia Botanical Club, Messrs. Van Pelt, Brown and Jahn rediscovered this interesting plant at Point Pleasant, on the south side of the Manasquan, and this colony is still flourishing.

Fl.—Probably late spring to autumn. *Fr.*—Early July into autumn, often persisting for a full season.

Maritime.—Pt. Pleasant.

SCHEUCHZERIA L.

Scheuchzeria palustris L. *Scheuchzeria*.

Scheuchzeria palustris Linnæus, Sp. Pl. 338. 1753 [Lapland, Switzerland, Borussia and Sweden].—Nuttall Genera I. 236, 1818.—Barton, Fl. Phila. I. 174. 1818.—Britton 256.—Keller and Brown 24.

This curious little northern bog plant is one of those species that, probably forced southward during glacial times, has managed to persist locally in cold bogs far south of its normal range. It occurs in various parts of the Pennsylvania Alleghanies and in the New Jersey mountains at Budd's Lake. In the southern part of the State it was known as early as 1818 to Barton and Nuttall, the former of whom recorded it as rare in Cranberry Swamps of Jersey not far from Philadelphia. Whether the two definite localities of which we have record were those known to the older botanists or not I cannot say. It is certainly of very rare occurrence in our region to-day, if not actually extinct. I have personally never collected it in New Jersey.

Fl.—Mid-May. *Fr.*—Mid-June to late June.

Middle District.—Longacoming, C. E. Smith, 1867 (UP, NB and P), Re-paupo, Benj. Heritage, July 15, 1892 (H), also (UP).

Family ALISMACEÆ. Arrow-heads, Etc.

Arrow-heads of one species or another are found along the shores of nearly all the streams or ponds in southern New Jersey. The Long-beaked Arrow-head is the species of the Pine Barrens and Cape May, while the Common Arrow-head takes its place in the Middle district; the others are less frequent and

occur mainly along the Delaware River or Bay. The variability in the leaves of these plants, both in size, shape and proportions, makes their identification often very puzzling, and those with lanceolate or submerged leaves (phyllodia) can only be certainly determined by their fruits, the relative size and shape of the achenes being the best character. The Water Plantain occurs in swamps except in the Pine Barrens.

Key to the Species.

- a. Flowers small (5 mm. broad), in a large erect panicle. *Alisma*, p. 168
- aa. Flowers large (12-35 mm. in diameter), in whorls of three on an erect scape.
 - b. Leaves arrow-shaped, basal lobes prominent.
 - c. Beak of achene erect, bracts longer than fruit pedicels. *Sagittaria longirostra*, p. 171
 - cc. Beak of achene horizontal, bracts shorter than fruit pedicel. *S. latifolia*, p. 169
 - bb. Leaves elliptic, sometimes with very short curved basal lobes (often on one side only), achene beak erect, fruit sessile. *S. rigida*, p. 171
 - bbb. Leaves ovate lanceolate or linear on slender petioles, often only submerged phyllopodia. Achene very small (1 mm.), nearly beakless; fruit long-pedicelled.* *S. graminea*, p. 172
 - bbbb. Leaves lanceolate or linear, strap-shaped or with a narrow blade, not more than 75-100 mm. in height. Whorls of flowers 1 to 3. *S. subulata*, p. 172
- aaa. Flowers not over 16 mm. in diameter, pedicelled in a terminal umbel.
 - b. Umbel 3 flowered, leaves taller than scape, petioles widened at base. *S. subulata*, p. 172
 - bb. Umbel 2-8 flowered, leaves shorter than scape, petioles not widened at base. *Helianthium parvulum*, p. 169

ALISMA L.

Alisma subcordatum Raf. Water Plantain.

Alisma subcordatum Refinesque, Md. Reposit. II. 5. 362. 1808 [United States].

Alisma plantago Britton 255.

Alisma parviflora Pursh, Fl. Am. Sept. I. 253 [Salt Marshes coast of N. J. and Penna.].

Common in swamps except in the Pine Barrens, where it is absent.

* Occasional forms of *S. longirostra* and *latifolia* with lanceolate leaves can be recognized by their large beaked achenes.

Fl.—Early July to late August. *Fr.*—Early August to early October.

Middle District.—New Egypt, Delanco, Delair, Swedesboro.

Coast Strip.—Anglesea (UP).

Cape May.—E. of Court House, Wildwood Jnc., Bennett, Cape May.

HELIANTHIUM Engelm.

Helianthium parvulum (Engelm.). Dwarf Water Plantain.

Echinodorus parvulus Engelm. in A. Gray Manual Ed. 2. 438. 1856 [Michigan].

Alisma tenellum Stone, Proc. Acad. Nat. Sci. 1908, 457.

This delicate little plant was apparently unknown from New Jersey until August 10, 1907, when it was discovered by the writer in company with Messrs. Stewardson Brown and Samuel S. Van Pelt on the edge of Nelly's Pond, north of Delanco.

Fl.—Late July to late August. *Fr.*—Mid-August to mid-September.

Middle District.—Delanco.

SAGITTARIA L.

Sagittaria latifolia Willd. Common Arrow-head.*

Sagittaria latifolia Willdenow, Sp. Pl. IV. 409. 1806 [Canada to Carolina].

Sagittaria variabilis Knieskern 30.

Sagittaria sagittifolia formæ *obtusata latifolia* et *hastata*.—Britton, p. 255.

This is the common Arrowhead of the Middle district, especially along the Delaware and other larger streams and their tributaries and also in the northern counties. While it has not been found on the coast it does occur on the lower Egg Harbor River along with species that have evidently worked their way inland.

* *Lophotocarpus spongiosus* Engelm. (in Gray Man. Ed. 5. 493. 1867) is included in Britton's Catalogue from tidal mud in the Delaware, Camden Co., N. J., authority of Mr. Chas. F. Parker. Mr. Parker's specimens, preserved with the rest of his herbarium at Princeton University, represent a plant that has been frequently collected at the above locality, and is well represented in the Academy herbarium. It has been generally, and I think rightly, regarded as a submerged form of *Sagittaria graminca*. The flowering scapes are 5-6 in. long, with very small flowers on pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in. long. The leaves are 2-3 in. long, tapering to a point and about $\frac{1}{4}$ in. wide near the base. I have never seen any fruiting specimens. The plant is certainly not *Lophotocarpus*.

It grows abundantly along the shores of rivers and lakes or fills entirely smaller ditches and ponds, sometimes on mud or in swamps, entirely exposed above the roots, and at other times submerged half-way to the blades and flowers.

Well distinguished from the following species by its horizontal achene beaks and its short bracts, it is extremely variable in size and in the character of its foliage. So far as I am aware the form with pubescent leaves, perhaps a distinct species, does not occur within our limits, but our glabrous plants show apparently all possible variation in hastate leaf forms.

What is apparently the most widely prevalent form has a broad blunt blade 110 mm. long from the petiole and about the same width at the middle, while the lobes are 100 mm. long and 50 mm. wide at their middle, and more or less incurved or parallel to the petiole. Petioles about 7.5 cm. (30 in.) long.

Another style has the blade longer and acute, 180 x 85 mm., lobes acute incurved 175 x 50 mm.

A much smaller type of plant has petioles only 2 dm. (8 in.) long, blade blunt and narrow with sides nearly parallel for most of the length, 65 x 12 mm.; lobes still narrower, 60 x 6 mm. This resembles the narrow-leaved form of the next species so abundant in the Pine Barrens, and like it, occasionally presents leaves without basal lobes. In one instance I have seen such leaves on the larger plant described above, the blades measuring 150 x 30 mm. Mr. Stewardson Brown tells me that a similar plant which he placed in a garden pond later developed regular sagittate leaves.

Another form of the common Arrowhead with narrow leaves has basal lobes strongly divaricate branching from the line of the blade at an angle of 45° . Some of these are large, blade 275 x 25 mm., and lobes 225 x 18 mm., while others measure only 225 x 12 mm., lobes 200 x 9 mm. The majority of the slender-leaved plants are probably of this type. While each plant appears to produce leaves of but one type, except for the occasional ones which lack basal lobes, I cannot see sufficient constancy of form to warrant the use of varietal names.

Fl.—Late July to late September. *Fr.*—Fully mature rarely before September.

Middle District.—Navesink Hills, Belmar (NY), Farmingdale, New Egypt, Hartford, Delair, Camden, Westville, Washington Park, Albion, Jumbo.

Coast Strip.—Weymouth (T), Mays Landing.

***Sagittaria longirostra* (Micheli). Long-beaked Arrowhead.**

Sagittaria sagittifolia (?) *longirostra* Micheli, in D. C. Monog. Phan. 3. 69. 1881. [Alabama].

Sagittaria Engelmanniana J. G. Smith, Ext. fr. 6th Ann. Rep. Mo. Bot. Gard. 15. 1894 (in part).—Keller and Brown 25.—Mackenzie, *Torrea* IX. 30. 1909.

Sagittaria sagittifolia formæ *angustifolia* et *gracilis* Britton 255.

Sagittaria longirostra Mackenzie, *Torrea* IX. 30. 1909.

Abundant on the edges of streams, bogs, etc., in the Pine Barrens and Cape May districts.

Fl.—Late June to late September. *Fr.*—Very rarely fully mature before late September.

Pine Barrens.—Lakehurst, Toms River, Brown's Mills (NB), Hanover, Forked River, Dover Forge, New Egypt, Pasadena, Hammonton, Parkdale, Quaker Bridge (NB), Mullica River (NB), Pleasant Mills (NB), Pancoast, Weymouth (T).*

Cape May.—Cape May.

The common Arrowhead of the Pine Barrens shows quite as much variation in leaf form as does the *Sagittaria latifolia* of the Delaware River and its tributaries, both varying from narrowly linear to broadly hastate, though the present species seems to exhibit the slender type of leaf more frequently. In fruit the two species are readily distinguished by the beak of the achene, which is erect in this form and horizontal in *S. latifolia*.

The narrow-leaved form of the Pine Barren plant was long confused with *S. engelmanniana*, a more northern species distinct from either of those here considered.

***Sagittaria rigida* Pursh. Sessile-fruited Arrowhead.**

Sagittaria rigida Pursh, Fl. Am. Sept. 397. 1814 [Oswego river, near Great Falls, N. Y.].—Keller and Brown 25.

Sagittaria heterophylla Wills 60.—Britton 256.

Locally in northern New Jersey and southward along the Delaware.

* Britton records it from Sandy Hook on the authority of I. C. Martindale, but I have been unable to verify the record.

Fl.—Late June to late July.

Middle District.—Westville (KB), Gloucester (KB), Camden.

***Sagittaria graminea* Michx. Grass-leaved *Sagittaria*.**

Sagittaria graminea Michaux, Fl. Bor. Am. II. 190. 1803 [Canada].—Smith Ext. fr. 6th Ann. Rept. Mo. Bot. Gard. 25. 1894.—Britton 256.—Keller and Brown 25.

Locally distributed in ponds and boggy spots in northern New Jersey, southward along the Delaware and in Cape May Co. and the Pine Barrens.

Most specimens of this arrowhead have well defined lanceolate leaf blades, but in wholly submerged plants, or notably those from tidal mud and gravel on the borders of the Delaware River, the leaf blades are partly or entirely absent, being represented by nearly linear (or the basal ones lanceolate) phyllodia. The specimens from the tidal mud I have never seen fruiting, but the flowers are much reduced and on very short pedicels, sometimes nearly sessile.

Mr. J. G. Smith records a specimen of *Sagittaria teres*, "N. J. Pine Barrens, Torrey, 1833,"* but in view of the fact that we have no other evidence of the occurrence of this species in southern New Jersey, it seems at least possible that the specimen referred to may have belonged to *S. graminea*.

Fl.—Late May to early September. *Fr.*—Late July into September.

Middle District.—Delanco, Delair, Fish House, Camden.

Pine Barrens.—Pleasant Mills, Main Road Sta. (T).

Cape May.—Bennett.

***Sagittaria subulata* (L). Subulate *Sagittaria*.**

Alisma subulata Linnæus, Sp. Pl. 343. 1753 [Virginia].

Sagittaria pusilla Willis 60.

Sagittaria natans Britton 256.

Sagittaria subulata Keller and Brown 25.

Muddy or gravelly river shores, northern New Jersey and south along the Delaware.

A low plant with club-shaped phyllodia, growing on the muddy flats along the Delaware, associated with *Isoetes*, *Erio-*

* Ext. Sixth Ann. Rep. Mo. Bot. Gard. 28. 1894.

caulon parkeri, etc.;. exposed at low tide and completely submerged when the tide is high.

Fl.—Late July to late August. *Fr.*—Fully mature very rarely before September.

Middle District.—Camden, Fish House, Bridgeport.

Family VALLISNERIACEÆ.

Several submerged aquatic plants with flowers that reach the surface of the water on slender scapes.

Key to the Species.

- a.* Leaves short (5-10 mm.), whorled or opposite. *Philotria*, p. 173
- aa.* Leaves long and narrow and grass-like, pistillate flowers on filiform scapes (6-12 dm. long), later coiling spirally, staminate flowers detached, floating. *Vallisneria*, p. 173
- aaa.* Leaves heart-shaped, broad and spongy, petioled. *Limnobiium*, p. 173

PHILOTRIA Rafinesque.

Philotria nuttallii (Planch.). Water Weed.

Anacharis Nuttallii Planchon, Ann. Mag. Nat. Hist. II. 1. 86. 1848 [North America].

Ponds and streams North and Middle districts.

Fl.—June to August (probably).

Middle District.—New Egypt, Delair, Camden, Cooper's Creek, Paulsboro, Repaupo, Swedesboro.

VALLISNERIA L.

Vallisneria spiralis L. Wild Celery. Tape Grass.*

Vallisneria spiralis Linnæus, Sp. Pl. 1015. 1753 [Pisa, Italy].—Knieskern 30.—Britton 229.

Larger streams of the North and Middle districts.

Fl.—July to September (apparently).

Middle District.—Bordentown, Delaire, Cooper's Creek, Timber Creek, Westville.

Coast Strip.—Pt. Pleasant (NY), Island Hts. (NY).

LIMNOBIUM L. C. Richard.

Limnobiium spongia (Bosc.). Frog's Bit.

Hydrocharis Spongia Bosc, Ann. Mus. Paris IX. 396. Pl. 30. 1807 [South Carolina].

Limnobiium spongia Knieskern 30.—Willis 60.—Britton 329.—Keller and Brown 26.

* The plant referred to by Harshberger under this name as abundant on the shore of Barnegat Bay (Proc. Acad. Nat. Sci., Phila., 1900, p. 657) is obviously *Zostera marina*.

Reported by Knieskern from Swimming River, Monmouth Co., the only known locality in the State and not recently found there so far as I know. No specimen seen.

Coast Strip.—Swimming River [Knieskern].

Order GRAMINALES.

A large group comprising the Grasses and Sedges.

Family GRAMINEÆ. Grasses.

Grasses may be distinguished from sedges by having hollow culms, round or flattened in cross section, and fruit in the form of grains.

Flowering and Fruiting Data.—Dates given indicate the season of full fresh panicles, racemes or spikelets, from the beginning of the flowering season to the latest date, when fresh intact inflorescence is still commonly present.

- a. Sweet scented, odor persisting after drying.
 - b. Inflorescence in a compact spike. [*Anthoxanthum odoratum*]*
 - bb. Inflorescence in an open panicle. *Savastana*, p. 216
- aa. Not sweet scented.
 - b. Fruit a prickly bur. *Cenchrus*, p. 213
 - bb. Fruit imbedded in the stalk (rachis), making a cylindrical, swollen, smooth or corrugated spike.
 - c. Spike uniform throughout. *Calorachis*, p. 181
 - cc. Spike with distinct staminate flowers above on a much more slender extension of the rachis. *Tripsacum*, p. 180
 - bbb. Fruit not a bur nor imbedded in the rachis.
 - c. Inflorescence obviously silky with soft hairs, appressed or in tufts.
 - d. Two large glumes embracing a spikelet of several flowers between them, plants green. *Danthonia sericea*, p. 231
 - dd. Inflorescence not in small spikelets, subtended by large glumes, plants more or less rusty purplish or glaucous.
 - e. Pubescence largely rusty, inflorescence forming a dense plume-like head 1-1.2 dm. long, 25-50 mm. broad or more, maroon or chestnut, flowers long awned. *Erianthus*, p. 181
 - ee. Pubescence white or whitish.
 - f. Hairs not reaching beyond the flower scales. Inflorescence in a long plume-like chestnut panicle. *Sorghastrum*, p. 184

* Sweet Vernal Grass. Extensively introduced in fields, etc.

ff. Hairs longer than the flower scales.

Andropogon, p. 182

cc. Inflorescence not obviously silky.

d. Plants low, creeping, flowers in flattened two-ranked spikelets.

Eragrostis hypnoides, p. 238

dd. Plants not creeping.

e. Flowers provided with one or more awns bent nearly at right angles and often twisted spirally.

f. Awn trifid, usually with the middle branch much longer than the others (which are erect), sometimes all three the same length.

Aristida, p. 217

ff. Awn single, one on each flower.

g. Flowers arranged in 3-7 scattered spikelets, each spikelet subtended by two large glumes.

Danthonia, p. 231

gg. Flowers (or spikelets) numerous, in an open or contracted panicle.

h. Awn 50 mm. long, seed black, soon dropping.

Stipa, p. 219

hh. Awn less than 25 mm. long.

i. Spikelets 9 mm. long.

[*Arrenatherum elatius*]*

ii. Spikelets less than 6 mm. long.

j. Leaves flat.

Sphenopholis palustris, p. 230

jj. Leaves involute, bristle form.

Deschampsia flexuosa, p. 229

ee. Flowers with essentially straight awns or more frequently none at all.

f. Inflorescence in a dense cylindrical spike (like timothy, barley or wheat).

g. With very delicate inconspicuous awns or none.

h. Spikes perfectly uniformly cylindrical, .5-1 dm. long, 6 mm. in diameter.

i. No awns. [*Phleum pratense*]†

ii. Thread-like projecting awns.

Alopecurus, p. 222

hh. Spikes less regular, more "chaffy."

i. Spikes buff or whitish.

j. 20-35 cm. long (coast sand).

Ammophila, p. 228

jj. 2-7 dm. long, tips of leaves prolonged into slender, involute bristle-like tips.

Sporobolus, p. 222

* Oat grass, an occasional weed.

† Timothy, extensively cultivated for hay.

- ii. Spikes greenish, not over one inch long,
plant less than 1 dm. high.
[*Aira praecox*]‡
- gg. With very conspicuous awns, making the whole
spike bristly.
h. Spike millet-like, flowers like round seeds at
the base of the (often tawny) projecting
bristles. *Chatochloa*, p. 212
- hh. Spikes rye-like, flowers long, spindle-shaped,
foliage often bluish green or glaucous.
i. Spikes compact.
j. Awns 50 mm. long.
[*Hordeum jubatum*]*
- jj. Awns 12-75 mm. long. *Elymus*, p. 245
- ii. Spikes with flowers scattered in pairs.
Hystrix, p. 246
- ff. Inflorescence in a dense plume-like contracted or
glomerate panicle.
g. Panicle 15×5 cm. or larger, purplish, leaves
20-75 mm. wide.
h. Long awns, spikelets one-flowered.
Echinochloa, p. 212
- hh. Not awned spikelets, several flowered.
Phragmites, p. 235
- gg. Panicle $10-15 \times 2-3$ cm. green or slightly pur-
plish, leaves 12 mm. wide.
h. Spikelets one-flowered.
i. A small tuft of hairs inside the glumes at
the base of the flowers.
Calamagrostis cinnoïdes, p. 227
- ii. No tuft at the base of the flowers.
Phalaris, p. 216
- hh. Spikelets two-flowered, foliage soft and
downy. [*Holcus lanatus*]†
- fff. Inflorescence in an open panicle, branches not at all
appressed to the main culm.
g. Pistillate flowers above, staminate below, tall
marsh grass. *Zizania*, p. 214
- gg. Flowers not separated.
h. Spikelets largely sessile and massed on the
branches.
i. Spikelets one-flowered.
j. Much flattened.
Homalocenchrus, p. 215

‡ Hair grass, an occasional weed.

* Squirrel-tail grass, an occasional weed.

† Meadow soft grass, commonly established in damp meadows. Pl. X.,
Fig. 4.

jj. Ovate not flattened. *Panicum*, p. 189

ii. Spikelets many flowered. *Poa*, p. 239

hh. Spikelets mainly pedicelled on filiform branches.

i. Spikelets one-flowered.

j. Much flattened.

Homalocenchrus, p. 215

jj. Not conspicuously flattened.

k. Panicle very open and diffuse with long filiform branches; usually equal to $\frac{1}{4}$ or $\frac{1}{2}$ the entire height of the plant, flowers more or less "chaffy," often very small.

l. Spikelets with long fluxuous hair-like terminal appendage.

Muhlenbergia capillaris, p. 221

ll. Spikelets without hair-like tips.

m. Plants glabrous.

n. Panicle bluish or grayish, erect, spikelets very minute 1.5-2 mm. bog plants.

Sporobolus, p. 222

mm. Panicle redish or silvery white.

o. Spikelets 5 mm. long, a tuft of hairs at the base of the flower.

Calamovilfa, p. 228

oo. Spikelets 1.5-3 mm., no tuft of hair, branches exceedingly long and capillary.

Agrostis, p. 224

mm. Plants hairy.

Panicle green or slightly red, coarse weeds.

Panicum capillare, p. 195

kk. Panicle with much shorter, stiffer branches, strictly erect, flowers globose or ovate, "seed-like." One glume very short and rudimentary at the base of the spikelet.

l. Subterranean straw colored fruits on root-like stems.

Amphicarpon, p. 188

ll. No subterranean flowers.

Panicum, p. 189

- ii. Spikelets several or many-flowered, obviously two-ranked and more or less flattened.
 - j. Spikelets 12 mm. or more in length.
 - k. Awned. *Bromus*, p. 244
 - kk. Not awned. *Festuca*, p. 243
 - jj. Spikelets less than 12 mm. in length.
 - k. Panicles more than half the height of the plant or secondary panicles, developing all the way to the base. *Eragrostis*, p. 237
 - kk. Panicles, if more than one, equal in height and less (usually much less) than half the height of the plant.
 - l. Spikelets not over 3 mm. long. *Panicularia nervata*, p. 241
 - ll. Spikelets over 3 mm. long.
 - mm. Panicle distinctly maroon. *Tridens flava*, p. 236
 - mmm. Panicle whitish or straw-color. *Panicularia*, p. 241
 - mmmm. Panicle green.
 - n. Flowers at the end of capillary drooping branches 50-100 mm. long. *Festuca nutans*, p. 244
 - nn. Flowers much more crowded on short branches, not over 25 mm. long. *Poa*, p. 239
- ffff. Spikelets (1) in a row or rows on slender branches attached to a main scape to which they are more or less appressed, or from which they branch out palmately or fan-like; or (2) arranged in a slender appressed raceme. Spikelets sessile or nearly so.
 - g. Spikelets one flowered.
 - h. Arranged in closely imbricated, one-sided spikes, which stand out at an angle or are appressed to the main scape. Flowers awned and much flattened. *Spartina*, p. 232
 - hh. Arranged on digitate or fan-like spikes.
 - i. Rachis flat or winged, flowers not awned nor scattered.
 - j. Spikelets flattened, disc-like, arranged in two rows. *Paspalum*, p. 184

- jj.* Spikelets ovate, not flattened.
Syntherisma, p. 188
- ii.* Flowers awned, scattered, or occupying only the end of the rachis; rachis not flattened.
Gymnopogon, p. 234
- hhh.* Arranged on short spikes, all closely appressed to the main stem and scarcely overlapping.
- i.* Awned. *Muhlenbergia*, p. 211
- ii.* Not awned.
- j.* Spikelets conspicuously flattened.
Homalocenchrus, p. 215
- jj.* Spikelets ovate, not flattened.
Panicum, p. 189
- hhhh.* Arranged in a slender appressed panicle.
- i.* Panicle very slender, but few short branches, all closely appressed, flowers long awned; awns 18-24 mm. long.
Brachyelytrum, p. 221
- ii.* Panicle of appressed branches, flowers not long awned; awns, if present, less than 10 mm.
- j.* Culms simple.
- k.* Leaves involute.
Panicum amarum, p. 196
- kk.* Leaves not involute, panicle dense and feathery.
- l.* A tuft of hairs at the base of the flowers within the glumes.
Calamagrostis canadensis, p. 227
- ll.* No tuft of hairs.
- m.* Inflorescence whitish or reddish, erect.
Agrostis, p. 224
- mm.* Inflorescence green drooping. *Cinna*, p. 224
- jj.* Culms much branched with numerous lateral panicles.
Muhlenbergia, p. 211
- gg.* Spikelets two to many flowered.
- h.* Spikes digitate or branching off in a fan-like arrangement from the common stalk. Spikelets sessile or nearly so.
- i.* Spikelets in two definite rows, contiguous. [*Eleusine indica*]*
- ii.* Spikelets not in two definite rows, scattered.
Diplachne, p. 237

* Crab grass. A common weed in lawns and about gardens.

hh. Spikelets sessile or nearly so in an erect (or sometimes slightly drooping) raceme.

i. Spikelets sessile, remote and alternately arranged on the somewhat zig-zag rachis.

[*Lolium perenne*]†

ii. Spikelets numerous, slightly pediceled, some in slender appressed branches, scattered along the main culm.

j. Leaves bristle-like, inflorescence 7-10 cm. in length. *Festuca*, p. 243

jj. Leaves flat, inflorescence 7-12 cm. in length. *Sphenopholis*, p. 229

jjj. Leaves flat, inflorescence, 20-25 cm. in length. *Uniola laxa*, p. 239

iii. Spikelets in a dense, erect, appressed spike.

j. Spikelets 5-15 mm. long.

k. Spike 120 × 25 mm. wide.

Panicularia obtusa, p. 241

kk. Spike 35 × 12 mm.

Distichlis, p. 239

kkk. Spike 75 × 12 mm. "wheat-like." [*Agropyron repens*]‡

jj. Spikelets 2-3 mm. long. Spike 75- × 12 mm.

Sphenopholis obtusata, p. 230

iiii. Spikelets in a somewhat looser but still appressed, often drooping raceme.

j. Spikelets 3 mm. long or less.

Poa or *Puccinellia*, pp. 239, 243

jj. Spikelets 25 mm. long.

Panicularia septentrionalis, p. 242

TRIPSACUM L.

Tripsacum dactyloides L. Gama Grass.

Plate VI., Fig. 1.

Coix dactyloides Linnæus, Sp. Pl. 972. 1753 [America].

Tripsacum dactyloides Nuttall Gen. I. 85. 1818.—A. Brown, Bull. Torrey Bot. Club VII. 114. 1880.—Britton 283.—Keller and Brown 30.

This large and striking grass with its peculiar thick and jointed inflorescence is restricted to the coastal strip, extending like other coastal species some distance up the larger rivers.

Fl.—Late July to late September.

† Ray-grass. A weed in waste and cultivated ground.

‡ Quitch-grass. An occasional weed.

Coast Strip.—Monmouth Beach Center (NB), Manahawkin, Ocean City, Clermont, Cape May Court House, Cape May, Fairton.

Also four miles north of Egg Harbor City (P), probably an intrusion from the river.

CÆLORACHIS Brongn.

Cælorachis rugosa (Nutt.). Wrinkled Gama Grass.

Pl. VI., Fig. 2.

Rottballia rugosa Nuttall, Gen. I. 84. 1818 [Florida].

Manisurus rugosa Stone, Proc. Acad. Nat. Sci., Phila., 1908, p. 458.

This southern species is restricted to the southern part of the Cape May peninsula, where it was first detected by Mr. O. H. Brown in August, 1908.

Fl.—Mid-August to late September.

Cape May.—Bennett.

ERIANTHUS Michaux.

Key to the Species.

a. Awns spirally twisted.

E. divaricatus, p. 182

aa. Awns straight.

E. saccharoides, p. 181

Erianthus saccharoides Michx. Plume Grass.

Pl. XV., fig. 2.

Erianthus saccharoides Michaux, Fl. Bor. Am. I. 55. 1803 [Carolina].

Erianthus alopecuroides Gray Man. Ed. I. 616. 1848.—Willis 77.—Britton 284.—Keller and Brown 31.

Erianthus compactus Nash, Bull. Torr. Bot. Club XXII. 419. 1895.

West Jersey, Cape May County, and rarely in the Pine Barrens and Coast Strip, local.

This fine grass, with its ample purplish brown plumes on stalks five feet in height, is one of the handsomest species of the family. It is especially frequent in moist ground along the coast of Cape May County.

Fl.—Late August to late September.

Middle District.—Bel. Burlington (C), Mickleton, Tomlinsons, Griffith's Swp. (P), Swedesboro (NB).

Pine Barrens.—Cedar Lake, Hammonton, Elwood (P), Egg Harbor City (in part coast intrusions).

Coast Strip.—Pt. Pleasant (Mck), Palermo.

Cape May.—Court House, Cold Spring.

Erianthus divaricatus (L.). Spiral-awned Plume Grass.

Andropogon divaricatum Linnæus, Sp. Pl. 1045. 1753 [North America].

A specimen of this species collected by the late Frank L. Bassett, at Hammonton, is in the U. S. National Herbarium. I have examined the spot where it is supposed to have been obtained, but found only *E. saccharoides*. The species is certainly very rare in the State.

ANDROPOGON L.*Key to the Species.*

- a. Spikes solitary, scattered along the stem.
 - b. Sheaths often greenish, spikelets 5-7 mm. *A. scoparius*, p. 182
 - bb. Sheaths always glaucous, spikelets 8-10 mm. *A. littoralis*, p. 182
- aa. Spikes in clusters of two to six.
 - b. Two to six on a long exserted common peduncle, purplish. *A. furcatus*, p. 183
 - bb. Two to three, included in spathe-like sheaths, scattered along the stem.
 - c. Spikes at length exserted, sheaths much inflated. *A. elliotii*, p. 184
 - cc. Spikes not exserted. *A. virginicus*, p. 183
- aaa. Inflorescence much branched and congested in a dense cluster. *A. corymbosus abbreviatus*, p. 183

Andropogon scoparius Michx. Broom Beard Grass.

Pl. VIII, fig. 6.

Andropogon scoparium Michaux, Fl. Bor. Am. I. 57. 1803 [Carolina].—Knieskern 40.—Britton 284.

Andropogon purpurascens Barton, Flor. Phil. I. 55. 1818.

Common throughout the State, except on the coast dunes, where it is replaced by the next.

This species and *A. virginicus* are the Beard Grasses which cover so many sandy fields with a tufted growth of buff or purplish stalks, some two feet in height, that persists through the winter.

Fl.—Late July to early October.

Middle District.—New Egypt, Brindletown, Hartford, Medford, Swedesboro.
Pine Barrens.—Atco, Pasadena.

Andropogon littoralis Nash. Seaside Beard Grass.

Andropogon littoralis Nash, Britton's Manual 69. 1901 [Seashore of New York and New Jersey].—Keller and Brown 31.

Andropogon maritimus Vasey, Grasses of U. S. 19. 1883.—Watson, Gray's Manual, Ed. 6. 637. 1890.

Common on the sand dunes of the coast and all over the lower extremity of the Cape May peninsula.

Fl.—Late August to early October.

Maritime.—Sandy Hook (NB), Barnegat City (L), Harvey Cedars (L), Beach Haven (L), Holgate's (L), Wildwood, Stone Harbor (S), Cape May (S), Cape May Pt.

***Andropogon corymbosus abbreviatus* Hackel. Bushy Beard Grass.**

Pl. VI., fig. 4.

Andropogon macrourus abbreviatus Hackel in DeCandolle Monogr. Phan. VI.:408. 1889 [New Jersey].

Andropogon macrourus Barton, Fl. Phila. 56. 1818.—Keller and Brown 31.—Knieskern 40.—Willis 77.—Torrey Fl. U. S. I. 157. 1824.

Andropogon glomeratus Britton 284.

Common in sandy swamps in the Pine Barrens and locally in the other districts. To the northward it occurs only at South Amboy.

The dry, yellowish head-clusters of this grass, supported on their slender stems, are a characteristic feature of the winter swamps.

Fl.—Late August to late September.

Middle District.—Asbury Park (NY), Woodbury, Mickleton, Kaighns Pt.

Pine Barrens.—Brindletown, Forked River, Clementon, Atco, Bear Swamp, Quaker Bridge, Egg Harbor City.

Coast Strip.—Surf City (L), Ship Bottom (L), Spray Beach (L).

Cape May.—Bennett (S), Cold Spring (S).

***Andropogon virginicus* L. Virginia Beard Grass.**

Pl. VIII, fig. 8.

Andropogon virginicus Linnæus, Sp. Pl. 1046. 1753 [America—prob. Virginia].—Knieskern 40.—Britton 284.

Dry ground, common throughout our region and rather less frequent in the northern counties.

Fl.—Mid-August to late September.

Middle District.—Lindenwold (S), Taunton (S), Mickleton, Albion, Swedesboro.

Pine Barrens.—Egg Harbor City.

Coast Strip.—Barnegat City (L), N. Beach Haven (L), Surf City (L), Spray Beach (L), Wildwood (HA).

Cape May.—Bennett (S), Cold Spring (S), Cape May (S), Cape May Pt. (S), Town Bank (S).

Andropogon furcatus Muhl. **Forked Beard Grass.**

Andropogon furcatus "Muhlenberg," Willdenow Sp. Pl. IV. 919. 1806 [North America—prob. Penna.].—Knieskern 40.

Andropogon provincialis Britton 284.

Northern New Jersey, extending locally into the Middle district and recurring in the lower Cape May peninsula.

Fl.—Late July to late September.

Middle District.—Tracy's (C), Manchester (C), Bordentown (H), Griffith's Swamp, Mickleton (H), Swedesboro.

Cape May.—Cold Spring (OHB).

Andropogon elliottii Chapman. **Elliott's Beard Grass.**

Andropogon Elliottii Chapman, Fl. S. States. 581. 1860 [Florida to N Carolina].—Long, Bartonian II. 18. 1910.

Confined to the southern part of the Middle district; originally discovered in the State by Charles D. Lippincott at Swedesboro September 2, 1894.

Fl.—Early September into October or even November.

Middle District.—Woodbury, Swedesboro, Sharptown.

Cape May.—Town Bank.

SORGHASTRUM Nash.**Sorghastrum nutans** (L.), (Michx.). **Indian Grass.**

Pl. XI., fig. 1.

Andropogon nutans Linnæus, Sp. Pl. 1045. 1753 [Virginia].

Andropogon avenaceus Barton, Fl. Phila. I. 54. 1818.

Sorghum nutans Knieskern 40.

Chrysopogon nutans Britton 284.

Dry soil frequent throughout, except in the Pine Barrens, where it is rare or casual.

Fl.—Mid-August to mid-September.

Middle District.—New Egypt, Griffith's Swamp, Orchard (S), Mickleton, Swedesboro.

Pine Barrens.—Pasadena, Landisville, Hammonton, Ab. Tuckahoe (S).

Coast Strip.—Manahawkin, Anglesea (UP).

Cape May.—Cold Spring (S), Cape May (OHB).

PASPALUM L.*Key to the Species.*

- a. Rachis membranaceous, broader than the spikelets. Plant decumbent or floating in water. *P. dissectum*, p. 185
- aa. Rachis narrower than the spikelets.
 - b. Culm simple, racemes stout.

- c. Spikelets 4 mm. in longest diameter. *P. glabratum*, p. 185
 cc. Spikelets 3 mm. long or less.
 d. Plant with dense long pubescence on sheaths and blades. *P. plenipilum*, p. 186
 dd. Plant glabrous.
 e. Racemes 3-5 cm. long, leaf-blades 1-2 cm. *P. læve*.
 ee. Racemes 8-10' cm. long, leaf-blades, 2-4 cm. *P. l. longifolium*, p. 186
 ddd. Plant slightly pubescent below.
 e. Racemes as in *P. læve*. *P. l. australe*, p. 186
 ee. Racemes long. *P. l. circulare*, p. 187
 bb. Culm branched above, with several lateral racemes, leaves pubescent.
 c. Plants erect, with longer leaves.
 d. Spikelets 1.5. mm. long, pubescent. *P. setaceum*, p. 187
 dd. Spikelets 2 mm. long, glabrous.
 e. Culm glabrous. *P. muhlenbergii*, p. 187
 ee. Culm densely pubescent, just below the raceme. *P. pubescens*, p. 187
 cc. Plants prostrate, with shorter leaves, spikelets 2 mm. long, pubescent. *P. psammophilum*, p. 186

***Paspalum dissectum* L. Walter's *Paspalum*.**

Paspalum dissectum Linnæus, Sp. Pl. 57. 1753 [America].

Paspalum membranaceum Keller and Brown 32.

Paspalum Walterianum Gray Manual, Ed. V. 645. 1867.—Britton 279.

This southern species was first discovered in New Jersey by Thomas Nuttall, who found it at Cape May. Although it has not, so far as I am aware, been found there since, it has been collected at several points in the southwestern part of the State. It occurs in low wet grounds, often on the bottoms of dried-up woodland pools.

Fl.—Mid-September into October.

Middle District.—Clarksboro, Mickleton (NB), Pennsgrove (NB), Woodstown, Riddleton.

Cape May.—Cape May (C).*

***Paspalum glabratum* (Engelm.). Engelmann's *Paspalum*.†**

Pl. XII., Fig. 6.

Paspalum floridanum glabratum "Engelm." Vasey, Contr. U. S. Nat. Herb. 3: 20. 1892 [N. Carolina, Texas and Arkansas].

* Reported from Landisville in Britton's Catalogue on authority of C. A. Gross, but no specimen was found in his herbarium.

As the work is going through the press Mr. O. H. Brown reports its rediscovery at Cape May.

† *Paspalum difforme* is recorded from New Jersey by Hitchcock and Chase in the new Gray's Manual, but Mrs. Chase informs me that the specimen came from the ballast ground at Camden, so that it is obviously not native.

Paspalum glabratum Keller and Brown 32.—Stone Proc. Acad. Nat. Sci., Phila., 1907. 458.—Stone Proc. Acad. Nat. Sci., Phila., 1908. 458.

This is another southern species discovered at Cape May in 1891, by several members of the Philadelphia Botanical Club. It is the largest of our *Paspalums* and does not range north of lower Cape May County.

Fl.—Early August to late September.

Coast Strip.—Anglesea (NB).

Cape May.—Cold Spring, Cape May.*

***Paspalum plenipilum* Nash. Long-haired *Paspalum*.**

Paspalum plenipilum Nash, Britton's Manual 73. 1901 [New Jersey].

Rather frequent in the Cape May and lower Coast districts.

Fl.—Late July to late September or into October.

Coast Strip.—Absecon.

Cape May.—Court House, Green Creek.

***Paspalum psammophilum* Nash. Prostrate *Paspalum*.**

Paspalum psammophilum Nash, Britton's Manual 73. 1901 [New Jersey].

Dry ground in the Middle and Pine Barren districts.

This species, like several others of recent date, was clearly differentiated by the late Charles E. Smith some fifty years ago as shown by notes accompanying specimens in his herbarium. Unfortunately he never put his views into print.

Fl.—Late July into October.

Middle District.—Delanco, Lindenwold, Medford (S), Swedesboro, Millville.

Pine Barrens.—Lakehurst, Speedwell (S), Twelfth St. Folsom.

Coast Strip.—Seaside Park.

***Paspalum læve australe* (Nash.). Southern *Paspalum*.**

Paspalum australe Nash, Britton's Manual 1039. 1901 [Stone Mt., Georgia].

Frequent in the Cape May and lower Coast districts.

Fl.—Late July to late September or into October.

Coast Strip.—Palmero.

Cape May.—Cold Spring.

***Paspalum læve angustifolium* (LeConte.). Narrow-leaved *Paspalum*.**

Pl. XII., fig. 5.

Paspalum angustifolium Le Conte, Jour. de Phys. XCI: 285. 1820 [Carolina].

* Collected Sept. 16, 1882, by C. F. Parker, and labeled *P. læve* in his herbarium at Princeton.

Frequent except in the Pine Barren district. All of our glabrous *Paspalums* seem to be referable to this form. The short-spiked *P. læve* has not yet been collected within our limits.

Fl.—Late July to late September or into October.

Middle District.—Braddock's Mill, Mickleton.

Coast Strip.—Palermo.

Cape May.—Cold Spring, Dias Creek.

***Paspalum læve circulare* (Nash.).**

Paspalum circulare Nash, Britton's Manual 73. 1901 [R. I. to Ky. and Mo.; south to Fla. and Tex.].

Occasional in the Coast strip.

Fl.—Late July to late September or into October.

Coast Strip.—Manahawkin, Palermo.

***Paspalum pubescens* Muhl. Pubescent *Paspalum*.**

Paspalum pubescens Muhlenberg, Gram. 92. 1817 [Pennsylvania].

Paspalum ciliatifolium Muhlenberg, Gram. 93. 1817 [N. J. references].—Torrey Flora U. S. I., 75. 1824.

Frequent or occasional throughout our region in dry sandy ground.

Fl.—Mid-August into October.

Middle District.—Tomlin, Dividing Creek.

Pine Barrens.—Ballinger's Mill (S), Pancoast (S), Ocean City Jnc.

Coast Strip.—Manahawkin, Sherburn's (L).

***Paspalum muhlenbergii* Nash. Muhlenberg's *Paspalum*.**

Paspalum Muhlenbergii Nash, Britton's Manual 75. 1901 [Massachusetts].

Frequent on the coast and very rare in the Pine Barrens.

Fl.—Early August into October.

Pine Barrens.—Albion.

Coast Strip.—Bay Head, Manahawkin, Palermo, Tuckahoe, Cold Spring.

***Paspalum setaceum* Michx. Slender *Paspalum*.**

Paspalum setaceum Michaux, Fl. Bor. Am. I. 43. 1803 [So. Carolina].—Barton Fl. Phila. I. 52. 1818.—Knieskern 39.—Britton 279.

This is the most plentiful of the small fruited *Paspalums* occurring in dry ground throughout the State.

Fl.—Early July into October.

Middle District.—New Egypt, Hornerstown, Washington Park (S), Lindenwold (S), Swedesboro.

Pine Barrens.—Toms River (McK), Whittings, Forked River, Pasadena, Speedwell, Landisville (T), Batsto (S), Egg Harbor City, Twelfth St., Folsom, Pancoast, Palermo, Middletown.

Coast Strip.—Manahawkin, Barnegat City (L), Surf City (L), St. Albans (L), Sherburn's (L).

Cape May.—South Dennis, Court House, Cold Spring, Cape May.

AMPHICARPON *Rafinesque*.

Amphicarpum amphicarpum (Pursh.) Pursh's Millet Grass.

Pl. VIII., fig. 1.

Milium amphicarpum Pursh, Fl. Am. Sept. I. 62, pl. 2. 1814 [New Jersey, near Egg Harbor].—Torrey Flora N. Y. 15. 1819.—Torrey Flora U. S. I. 77. 1824.

Milium ciliatum Muhlenberg Gram. 77. 1817.

Amphicarpum Purshii Knieskern 39.—Britton 279.—Keller and Brown 32.

This curious grass, originally discovered by Frederick Pursh "near Egg Harbor" (probably = Beesley's Point), does not range north of the New Jersey Pine Barrens, nor has it been found in the western part of the State beyond the limits of this region. It is plentiful in damp sandy soil among the Pines, and grows profusely in the damp sand thrown up into dykes around the cranberry bogs.

The peculiarity of this grass lies in the production of subterranean fruits scattered among the slender roots, in addition to the Panicum-like spike of normal seeds, which is conspicuous above ground.

Fl.—Early August to mid-September.

Pine Barrens.—Toms River (McK), Manchester (NB), Lakehurst, Brown's Mills, Waretown, Five miles so. New Egypt, West Creek (S), Speedwell (S), Winslow, Crowleypoint, Egg Harbor City, Twelfth St. Folsom.

Cape May.—Bennett, Cape May Pt. (OHB).

SYNTHERISMA *Walter*.

Key to the Species.

a. Rachis broadly winged.

b. Plant glabrous.

bb. Plant hirsute.

aa. Rachis not winged.

[*S. linearis*]*

[*S. sanguinalis*]†

S. filiformis, p. 189

* Small crab-grass, a weed about gardens, etc.

† Large crab-grass, an abundant weed everywhere in cultivated and waste ground. Grows luxuriantly on the sandy ground back of the coast dunes, creeping culms reaching a length of six or eight feet: seems like a native in such locations.

Syntherisma filiformis (L.). Slender Finger-grass.

Pl. VII, Fig. 6.

Panicum filiformae Linnæus, Sp. Pl. 57. 1753 [North America].*Panicum filiforme* Kneiskern 39.—Britton 279.*Digitaria pilosa* Pursh, Fl. Am. Sept. I. 70. 1814.

Frequent in dry sandy soil throughout our region and reported from only two stations in the northern counties.

This native finger-grass may be distinguished from the introduced species so common on roadsides, fields and grass plots, by its slender erect habit. The Large and Small Crab grass *S. sanguinalis* and *S. linearis* are coarse and more or less prostrate; the former is a very abundant weed along the coast, trailing over the sand hills and appearing like a native plant.

Fl.—Late July to mid-September.

Middle District.—New Egypt, Haddonfield (S), Griffith's Swamp, Medford (S), Swedesboro.

Pine Barrens.—Clementon, Swedesboro (S).

Coast Strip.—St. Albans (L), Beach Haven (L), Peahala (L), Sherburn's (L), Ocean City.

Cape May.—Cold Spring (OHB), Cape May (S), Cape May Pt.

PANICUM L.

Flowering and Fruiting Data.—Dates given cover the period of both primary and secondary panicles. In most species they follow one another so closely as to leave no appreciable time when the plant is not in flower or fruit.

*Key to the Species.***a.* Annual.*b.* Inflorescence, a more or less diffuse panicle.

c. Spikelets tuberculate. *Panicum verrucosum*, p. 194

cc. Spikelets not tuberculate.

d. First glume not more than one-quarter the length of the spikelet. *P. dichotomiflorum*, p. 195

dd. First glume one-half the length of the spikelet.

e. Panicle more than half the total height of the plant.

P. capillare, p. 195

ee. Panicle not more than half the height of the plant.

P. philadelphicum, p. 195

* Adapted from Hitchcock and Chase. Practically all the specimens listed beyond were identified by these authors when engaged upon their monograph. Additional South Jersey localities given in this work are quoted in lists of localities and credited to "H. & C."

aa. Perennial.

- b. Spikelets short pedicelled along one side of the rachis, forming spike-like racemes. *P. hemitomon*, p. 194

bb. Spikelets in open, rarely contracted panicles.

- c. Basal leaves different from culm leaves, usually forming winter rosettes.

d. Spikelets glabrous.

- e. Spikelets 3mm. or more long, strongly nerved.

f. Spikelets pointed, blades elongated.

P. depauperatum, p. 198

- ff. Spikelets blunt, blades not elongated, 3.2-3.3 mm.; long sheaths or some of them hispid.

P. scribnerianum, p. 209

cc. Spikelets less than 3mm. long.

- f. Second glume and sterile lemma exceeding the fruit and pointed beyond it, spikelets 2.2-2.9 mm. long.

g. Spikelets elliptic, fruit 2 mm. long.

P. aculeatum, p. 210

- gg. Spikelets ovate, broadest below the middle, 2 mm. or less.

h. Sheaths (at least the secondary) hispid.

P. scabriusculum, p. 210

hh. Sheaths glabrous. *P. cryptanthum*, p. 210

- ff. Second glume and sterile lemma, not pointed beyond the fruit.

g. Ligule 2-3 mm. long. *P. spretum*, p. 202

gg. Ligule obsolete.

h. Spikelets 1.5 mm. long or less.

- i. Nodes bearded. *P. microcarpon*, p. 200

ii. Nodes not bearded.

- j. Spikelets 1.5-1.6 mm. blades 50-80 mm. long, 4-7 mm. wide.

P. caeruleascens, p. 200

- jj. Spikelets 1.2-1.4 mm., blades not over. 30 mm. long, 1.5-3 mm. wide.

P. ensifolium, p. 207

jjj. Spikelets 2mm. long or more.

- k. Culms soon prostrate, vine-like, branches divaricate.

P. lucidum, p. 200

- kk. Culms not vine-like, branches not divaricate.

l. Nodes glabrous; autumnal form upright. *P. dichotomum*, p. 199

- ll. Nodes, at least the lowest, usually bearded, autumnal form, top-heavy and reclining.

P. barbulatum, p. 200

dd. Spikelets pubescent.

e. Spikelets 3 mm. or more long.

f. Blades elongated leaves 2-5 mm. wide.

P. depauperatum, p. 198

ff. Blades not elongated.

g. Nodes bearded, leaves 15-30 mm. wide.

P. boscii, p. 211

gg. Nodes not bearded.

h. Sheaths glabrous.

i. Spikelets 3.5-3.8 mm. long.

P. latifolium, p. 211

ii. Spikelets 3 mm. long.

P. commutatum, p. 208

hh. Sheaths pubescent.

i. Pubescence appressed, spikelets 3.5-4.

P. oligosanthos, p. 209

ii. Pubescence spreading.

j. Blades 20 mm. wide.

P. clandestinum, p. 211

jj. Blades 6-12 mm. wide.

P. scrinerianum, p. 209

cc. Spikelets less than 3 mm. long.

f. Blades elongated.

P. linearifolium, p. 198

ff. Blades not elongated.

g. Spikelets attenuated at the base.

h. Autumnal blades flat, blades 80-120 $\times$ 4-8 mm.

P. angustifolium, p. 199

hh. Autumnal blades involute, blades 40-60 $\times$ 2-5 mm.

P. aciculare, p. 199

gg. Spikelets not attenuated at base.

h. Ligule manifest 1-5 mm. long.

i. Sheaths glabrous.

j. Panicle narrow $\frac{1}{4}$ - $\frac{1}{3}$ as wide as long.

P. spretum, p. 202

jj. Panicle open nearly as wide as long.

P. lindheimeri, p. 202

ii. Sheaths pubescent.

j. Ligule 1-1.5 mm. long, culms and sheaths appressed pubescent.

k. Spikelets 1.8-1.9 mm. long, plant bluish green. *P. tsugetorum*, p. 206

kk. Spikelets 1.5 mm. long, nearly glabrous, plant olivaceous.

P. oricola, p. 204

jj. Ligule 2-5 mm. long.

k. Spikelets 1-1.3 mm. long, culm and sheath soft appressed pubescent.

l. Spikelets 1.2-1.3 mm. long.

P. leucothrix, p. 202

- ll. Spikelets not over 1 mm. long.
P. wrightianum, p. 201
- kk. Spikelets more than 1.5 mm. long.
- l. Spikelets not over 2 mm. long.
 - m. Plant grayish, velvety pubescent. *P. lanuginosum*, p. 204
 - mm. Plant pubescent, but not velvety.
 - n. Upper surface of blade glabrous.
P. tennesseense, p. 203
 - nn. Upper surface of blade pubescent.
 - o. Spikelets 1.3-1.5 mm. long, blade long, pilose above.
P. meridionale, p. 203
 - oo. Spikelets 1.6-2 mm. long, blade appressed, pubescent above.
P. huachucae, p. 203
- ll. Spikelets 2.2 mm. or more.
 - m. Pubescence on culm horizontal, spreading.
P. villosissimum, p. 204
 - mm. Pubescence on culms appressed.
P. pseudopubescens, p. 205
- hh. Ligule obsolete or less than 1 mm. long.
- i. Nodes bearded.
- j. Spikelets 1.5-1.6 mm. long.
P. microcarpon, p. 200
- jj. Spikelets 2.2 or more. *P. clutei*, p. 201
- ii. Nodes not bearded.
P. mattamuskeetense, p. 201
- j. Plants densely gray velvety throughout, a viscid ring below the nodes.
P. scoparium, p. 209
- jj. Plants not gray velvety.
- k. Some sheaths pilose or hispid.
- l. Pubescence papillose hispid.
 - m. Spikelets 2.3-2.6, pointed.
P. scabriusculum, p. 210
 - mm. Spikelets obovate, obtuse, 3 mm. long.
P. clandestinum, p. 211
- ll. Pubescence ascending pilose.
 - m. Spikelets 2-2.5 mm. long.
 - n. Spikelets 2.4 mm. long.
P. commonsianum, p. 205

- nn.* Spikelets 2-2.1 mm. long.
P. c. addisoni, p. 205
- mm.* Spikelets not over 1.3-1.4 mm. long, nearly globular.
P. columbianum thinium, p. 207
- kk.* Sheaths glabrous or pubescent only.
- l.* Spikelets globular, 1.8 mm. long, blades cordate, ciliate at the base.
m. Panicle as broad as long.
P. sphaerocarpon, p. 207
- mm.* Panicle narrow, more than $\frac{2}{3}$ as broad as long.
P. polyanthes, p. 208
- ll.* Spikelets not globular.
- m.* Culms prostrate and vine-like, branches divaricate, spikelets not over 2.1 mm. long.
P. lucidum, p. 200
- mm.* Not vine-like nor divaricate.
- n.* Spikelets 2.5-3 mm. long.
- o.* Blades rarely more than 10 mm. broad, culms crisp puberulent. *P. ashei*, p. 208
- oo.* Blades usually 1.5 or more in width, culms glabrous.
P. commutatum, p. 208
- nn.* Spikelets not over 2.3 mm. long.
P. clutei, p. 201
- mm.* Spikelets not over 1.7 mm. long.
- o.* Culms conspicuously puberulent, spikelets turgid.
P. columbianum, p. 206
- oo.* Culms glabrous.
P. ensifolium, p. 207
- cc.* Basal leaves not different from those of the culm.
- d.* With creeping scaly root stocks, spikelets long pedicelled, not second, in open or contracted panicle.
- e.* Panicle diffuse.
- f.* Panicle open, spikelets 3.5-5 mm. long, beaked.
P. virgatum, p. 196
- ff.* Panicle more or less contracted, 3.2 mm. long, not beaked.
P. v. cubense, p. 195
- ee.* Panicle contracted, seashore species. *P. amarum*, p. 196
- dd.* Not forming a creeping scaly rootstock.

- e. Rootstocks present, culms but little compressed, spikelets set obliquely on their appressed pedicels. *P. anceps*, p. 198
- ee. Root stocks none, culm strongly compressed, spikelets not obliquely arranged.
- f. Ligules ciliate, basal leaves half the length of the culm, panicle longer than the upper leaves.
P. longifolium, p. 197
- ff. Ligules not ciliate, basal leaves in short tufts, upper leaves about equaling the panicle.
- g. Fruit stipitate, spikelets 2.5-2.8 mm. long, secund.
P. stipitatum, p. 197
- gg. Fruit not stipitate, spikelets not secund.
- h. Spikelets 1.8-2 mm. long, branches ascending or spreading.
P. agrostoides, p. 196
- hh. Spikelets 2.5 mm. long, branches ascending, dense.
P. condensum, p. 197

Panicum hemitomom* Schultes. Narrow Panic-Grass.

Panicum hemitomom Schultes, Mant. II. 227. 1824 [n. n. for *P. walteri* Muhl.=Ell. from near Savannah].

Brachiaria digitarioides Stone, Bartonian II., p. 26, 1910.

This is another southern species restricted to wet swamps in the southwestern portion of the Cape May peninsula. It was discovered in August, 1909, by Mr. O. H. Brown.

In *Torreyia* 1907, p. 39, the writer erroneously recorded this grass from Cape May county, the specimens proving to be *Panicum condensum* Nash. (see Proc. A. N. S. Phila., 1908, p. 458).

The same error was made by Keller and Brown, *Flora of Philadelphia*, 1905, p. 33.

Fl.—Late June to late July (apparently).

Cape May.—Bennett, Cape May.

***Panicum verrucosum* Muhl. Warty Panic Grass.**

Panicum verrucosum Muhlenberg, Gram. 113. 1817 [New Jersey].—Britton 281.—Keller and Brown 36.

Sandy swamps; common throughout the Pine Barrens and frequent in the lower part of the Middle district. This is a characteristic south Jersey grass distinguished from all the other members of the genus by the minute tubercles on the spikelets.

Fl.—Early August to late September.

* In the genus *Panicum* a number of New Jersey records published in "The North American Species of *Panicum*" by Hitchcock and Chase (Contr. from the U. S. Nat. Herb. vol. 15, 1910), are cited and marked H. & C.

Middle District.—Fish House, Woodbury (C), Washington Park (S), Westville, Tomlin, Mickleton, Swedesboro, Salem (S), Dividing Creek.

Pine Barrens.—Sea Bright (NB), Manchester (NB), Lakehurst, Forked River, Bamber, Speedwell, Bear Swamp, Clementon, Atsion, Egg Harbor City, Landisville, Tuckahoe (S), Pancoastville (T).

Cape May.—Court House, Clermont.

***Panicum capillare* L. Witch Grass.**

Pl. IX., fig. 3.

Panicum capillare Linnæus, Sp. Pl. 58. 1753 [Virginia and Jamaica].—Britton 281.

Common throughout, except in the Pine Barrens. Whatever the original habitat of this grass may have been, it is now essentially a weed abounding in cultivated and waste ground, with little to remind one of its native origin.

Fl.—Late August to late September.

***Panicum philadelphicum* Bernh. Wood Witch Grass.**

Panicum philadelphicum Bernhardt, in Nees Fl. Bras. 198. 1829 [Philadelphia].

Dry ground, edges of woods, etc., in the Middle and Cape May districts.

A more delicate ally of the preceding.

Fl.—Mid-August to mid-September.

Middle District.—Medford, Swedesboro, Riddleton.

Pine Barrens.—Lakehurst (H&C), Sea Isle Jnc.

Cape May.—Wildwood Jnc. (OHB), Cold Spring.

***Panicum dichotomiflorum* Michx. Spreading Panic Grass.**

Panicum dichotomiflorum Michaux, Fl. Bor. Am. I. 48. 1803 [Alleghany Mts.].

Panicum proliferum Britton, 281.

Wet places; common along the larger streams of the Middle district and the salt marshes of the coast; only casually reported from the northern counties.

Fl.—Mid-July to early October.

Middle District.—Freehold (H&C), Fish House (S), Camden, Westville, W. Deptford, Swedesboro.

Coast Strip.—Deal (P), Cox's, Spray Beach (L), Barnegat City (L).

Cape May.—Cold Spring (S), Cape May (OHB).

***Panicum virgatum* L. Broom-like Panic Grass.**

Pl. IX., Fig. 2.

Panicum virgatum Linnæus, Sp. Pl. 59. 1753 [Virginia].—Britton 282.

Abundant along the salt marshes and the Delaware and other large rivers; only casual elsewhere and probably introduced.

Fl.—Mid-July to mid-September.*Middle District.*—New Egypt, Fish House, Camden (H&C), Kaighns Pt., Swedesboro, Salem, Beaver Dam.*Pine Barrens.*—Speedwell (S), Landisville, Winslow (S), Hammonton.*Coast Strip.*—Sandy Hook, Pt. Pleasant, Seaside Park, Forked River, Ship Bottom (L), Beach Haven (L), Barnegat City (L), Spray Beach (L), Longport (S), Ocean City (S), Stone Harbor (S), Five-Mile Beach, Cape May.***Panicum virgatum cubense* Griseb. Cuban Panic Grass.***Panicum virgatum cubense* Grisebach, Cat. Pl. Cub. 233. 1866 [Hanabana Cuba].

Similar situations to the preceding. The majority of the specimens examined, however, are from farther inland, either in the Pine Barrens or Middle district.

Fl.—Early July to early September.*Middle District.*—Lindenwold. Burlington.*Pine Barrens.*—Hanover, Pasadena, Atsion (H&C), Egg Harbor City, Island Heights.***Panicum amarum* Ell. Beach Panic Grass.***Panicum amarum* Elliot, Bot. S. C. and Ga., I. 121. 1817 [South Carolina].—Keller and Brown 36.*Panicum amarum* var *minor* Britton 282.

Sea beaches frequent; extending up the bay shore at least as far as Town Bank.

Fl.—Early September to late October.*Maritime.*—Sandy Hook, Long Branch, Seaside Park, Barnegat City (L), St. Albans (L), Holgate's (L), Ocean City, Holly Beach (UP), Cape May, Cape May Point.***Panicum agrostoides* Spreng. Agrostis-like Panic Grass.***Panicum agrostoides* Sprengel, Pl. Pugill II.: 4. 1815 [Pennsylvania].—Britton 281.

Moist open ground; common in the northern counties and casual southward in the Middle district.

Fl.—Mid-July to early September.

Middle District.—Clementon, Swedesboro, Dividing Creek.

Pine Barrens.—Atsion (H&C), Landisville.

***Panicum stipitatum* Nash. Long Panic Grass.**

Panicum stipitatum Nash., Britton's Manual 83. New name for *P. elongatum* Pursh nec Salisb. [New Jersey to N. Carolina].

Moist, sandy, open ground in the lower part of the Middle district; not very common.

Fl.—Mid-July to early September.

Middle District.—Delair, Camden (H&C), Washington Park, Moorestown, Medford (S), Mickleton, Tomlin, Swedesboro (CDL).

***Panicum condensum* Nash. Clustered Panic Grass.**

Pl. XII., Fig. 1.

Panicum condensum Nash, in Small's Southern Flora. 93. [South Carolina and Florida].

Brachiaria digitarioides Keller and Brown 33.—Stone Torrey 1907, 39 [See Proc. A. N. S. Phila., 1908, 458].

Usually in shallow water, swamps and ditches, southern part of the Cape May peninsula.

First found September 1, 1902, at Peermont, by the writer, and erroneously recorded as *Brachiaria digitarioides* (see synonymy).

Fl.—Early August to late September.

Coast Strip.—Holly Beach, Piermont (S).

Cape May.—Cold Spring.

***Panicum longifolium* Torr. Long-leaved Panic Grass.**

Pl. VII., Fig. 5.

Panicum longifolium Torrey, Fl. V. S. 149. 1824 [Pine Barrens of New Jersey].

Panicum anceps Britton 281 (in part).

Sandy swamps throughout our region, except the upper part of the Middle district; probably most common in the Pine Barrens and along the western border of the coast marshes. Discovered in New Jersey in 1819 by James Goldie, a Scottish botanist, who travelled and collected here at that time.

Fl.—Early August to mid-September.

Middle District.—Washington Park (S), Lindenwold (S).

Pine Barrens.—Pt. Pleasant (S), New Lisbon, Manchester (P), Forked River, Waretown, Manahawkin, Bear Swamp (S), Speedwell (S), Clementon, Williamstown Inc., Jackson (P), Ancora (P), Cedar Brook, Parkdale (S), Atsion (H&C), Egg Harbor City, Mays Landing (S), Absecon (S), Folsom 12th St., Woodbine, Palermo (S).

Cape May.—Dias Creek, Bennett, Cold Spring (S).

***Panicum anceps* Michx. Beaked Panic Grass.**

Panicum anceps Michaux, Fl. Bor. Am. I. 48. 1803 [Carolina].—Britton 281 (in part).

Moist open ground, Middle and Cape May districts; not very common.

Apparently neither this or the preceding occur in the northern counties.

Fl.—Late July to early September.

Middle District.—New Egypt, Bordentown, Locust Grove, Medford, Mickleton (H), Woodstown (P).

Cape May.—Court House, Cape May (OHB).

***Panicum depauperatum* Muhl. Starved Panic Grass.**

Panicum depauperatum Muhlenberg, Gram. 112. 1817 [Pennsylvania].—Britton 279.

Dry sandy or rocky ground throughout the State, except in the Pine Barrens, where it is rare and perhaps introduced.

Fl.—Late May to late July.

Middle District.—Farmingdale, Allaire, New Egypt (C), Delanco, Riverside, Hainesport, Pensauken, Browns Mills, Lawnside (S), Mickleton, Grenloch, Tomlin, Franklinville (P), Almonessen, Swedesboro, Bridgeton, Millville.

Pine Barrens.—Toms River (S), Whitings, Waretown, Pen Bryn (S), Atco, Williamstown Inc., Newfield, Landisville (T), Inskip.

Cape May.—Cape May (OHB).

***Panicum linearifolium* Scribner. Linear-leaved Panic Grass.**

Panicum linearifolium Scribner, Britton and Brown's Ill. Flora III.: 500 f. 268a. June, 1898 ["Washington, D. C., prob=Md.].

Very rare; only reported from one station within our limits, where it was collected by Mr. C. L. Pollard, 1897.

Coast Strip.—Wildwood (H&C).

***Panicum aciculare* Desv. Bristling Panic Grass.**

Panicum aciculare "Desv" Poir, in Lamark Encycl. Suppl. 4:274. 1816 [S. E. United States].

Dry sandy ground in the southern part of the Cape May peninsula, where it reaches the northern limit of its range. First found in the State by the writer on June 30, 1909, near Cold Spring.

Fl.—Late June to late September.

Cape May.—Cold Spring (S), Bennett, Fishing Creek (OHB).

***Panicum angustifolium* Ell. Narrow-leaved Panic Grass.**

Panicum angustifolium Elliot, Bot. S. C. and Ga. I.: 129. 1816 [Florida].

Dry sandy ground in the southern part of the Cape May peninsula, where it was discovered by Mr. O. H. Brown, September, 1909, extending the range north from Frankford, Delaware. The specimen labelled from "the Schuylkill River below Reading, Pa.," in the Philadelphia Academy Herbarium, while undoubtedly this species must have been mislabeled or introduced at that station, as the locality is so completely out of its proper habitat. Its chance introduction by canal boats is easily possible.

Fl.—Late June to late September (probably).

Cape May.—Green Creek.

***Panicum dichotomum* L. Forked Panic Grass.**

Pl. IX., Fig. 1.

Panicum dichotomum Linnæus, Sp. Pl. 58. 1753 [Virginia].—Britton 280.

A species of dry woodland not particularly abundant in our region, but probably more characteristic of the Middle district than of the Pine Barrens. In the latter it is found mostly along the cleared strip of ground bordering the railroads from which the undergrowth is constantly cut away as a precaution against the spread of forest fires, and where various dry ground *Panicums* flourish luxuriantly. That some of them owe their presence to the railroads I have little doubt.

Fl.—Early June to mid-July.

Middle District.—Mickleton, Sicklerville (S), Yorktown (S).

Pine Barrens.—Lakehurst, Pancoast (S).

Cape May.—Court House.

***Panicum cærulescens* Hack. Bluish Panic Grass.**

Panicum cærulescens "Hack" Hitchcock Contr. Nat. Herb. XII. 219. 1909 [Miami, Fla.].

Vicinity of Cold Spring, Cape May Co., the northern limit of the species; collected June 30, 1909, by the writer.

Fl.—Late June to ———

Cape May.—Cold Spring (S).

***Panicum barbulatum* Michx. Large-fruited Barbed Panic Grass.**

Panicum barbulatum Michaux, Fl. Bor. Am. I. 49. 1803 [Carolina].

This has the same distribution as *P. dichotomum*, occurring in the Pine Barrens under the same conditions.

Fl.—Early June to mid-July.

Middle District.—Woodbury, Medford (S), Clementon (S), Bridgeton (S).

Pine Barrens.—Pancoast, Dennisville (S).

Cape May.—Court House, Bennett.

***Panicum lucidum* Ashe. Sphagnum Panic Grass.**

Panicum lucidum Ashe, Jour. Elisha Mitch., Sci. Soc. XV. 47. 1898 [Lake Mattamuskeet, N. C.].—Keller and Brown 36.

Panicum sphagnicola Nash, Brit. Man. Ed. I. 85.

Plentiful in bogs in the Pine Barrens and Cape May region, and less abundant in the Middle district.

Fl.—Mid-June to mid-August.

Middle District.—Farmingdale, Grenloch, Tomlin, Lawnside (S), Beaver Dam (S).

Pine Barrens.—Allaire, Lakehurst, Davenport, Forked River, Coxe's, Bamber, Speedwell, Chatsworth, High Bridge (S), Atsion (H&C), Vine-land (S), Folsom 12th St., Pancoast, Tuckahoe (S), Palermo.

Coast Strip.—Anglesea, Wildwood.

Cape May.—Court House, Dias Creek, Cold Spring.

***Panicum microcarpon* Muhl. Barbed Panic Grass.**

Panicum microcarpon "Muhlenberg," Elliot Bot. S. C. and Ga. 1816 [Georgia].

Panicum barbulatum Keller and Brown 36.

?*Panicum nitidum* var. *ramulosum* Torrey, Flora Nor. U. S. 146. 1824.—[Quaker Bridge, N. J.].

Damp shaded spots; apparently common except in the Pine Barrens.

Fl.—Mid-June to mid-August.

Middle District.—Shark River, Farmingdale, Allaire (S), Pt. Pleasant (S), New Egypt, Birmingham, Fish House, Medford (S), Ballinger's Mill, Lawnside, Albion, Clementon, Sicklerville, Swedesboro, Yorktown, Riddleton, West of Vineland (S).

Coast Strip.—Palermo, Peermont (S), Avalon, Wildwood.

Cape May.—South Dennis (S), Court House.

***Panicum mattamuskeetense* Ashe. Mattamuskeet Panic Grass.**

Panicum mattamuskeetense Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 45. 1898 [Lake Mattamuskeet, N. C.].

Differs from the next only in its greater pubescence; possibly not distinct, in which case all the specimens will be known by the present name, which is the older. The only specimen that seems to belong here is one collected by Mr. Stewardson Brown at Anglesea, Cape May Co., in 1897.

Fl.—Mid-June to early August.

Coast Strip.—Anglesea.

***Panicum clutei* Nash. Clute's Panic Grass.**

Panicum clutei Nash, Bull. Torr. Bot. Club, p. 569. 1899 [Tuckerton to Atsion, N. J.].

An abundant and easily recognized grass of damp spots in the Pine Barrens and Cape May region, and occurring here and there in the Middle district also.

Fl.—Mid-June to early August.

Middle District.—Como, Farmingdale, New Egypt, 3 miles west of Camden, Griffith's Swamp, Lawnside, Kirkwood, Yorktown, Centerton, Dividing Creek.

Pine Barrens.—Allaire, Pt. Pleasant, Toms River, Lakehurst, two miles south New Egypt, Bamber, Pasadena, Manahawkin, Tuckerton, Speedwell (S), Chatsworth, White Horse, Bear Swamp (S), Ballinger's Mills, Clementon, Albion, Sicklerville, Ancora, Landisville, Winslow Inc., Pancoast, Millville.

Cape May.—Bennett, Court House (S).

***Panicum wrightianum* Scribn. Wright's Panic Grass.**

Panicum Wrightianum Scribner, Bull. XI. Div. Agrost. U. S. Dept. Agr. 44. 1898 [Biloxi, Miss.].—Stone, Bartonian II., p. 29, 1910.

Bogs of southern Cape May County.

This beautiful little *Panicum*, distinguished from all our other species by the extremely minute spikelets, was discovered near Bennett, June 30, 1909, by the writer in company with several

members of the Philadelphia Botanical Club. It had not been recorded previously from north of North Carolina.

Fl.—Late June to late September.

Cape May.—Bennett.

***Panicum spretum* Schultes. Eaton's Panic Grass.**

Panicum spretum Schultes, Mant. II. 248. 1824 [New England].

Panicum paucipilum Nash, Bull. Torr. Bot. Club, p. 573. 1899 [Wildwood, N. J.].

Plentiful in bogs and wet swamps in the Pine Barren and Cape May districts. The types of *P. paucipilum* were collected by Mr. E. P. Bicknell, May 30, 1897, at Wildwood, N. J. Specimens from Lakehurst differ in having the spikelets more elongated, but are regarded as inseparable by Hitchcock and Chase.

Fl.—Late June to early August.

Pine Barrens.—Lakehurst, Bamber, Chatsworth, Bear Swamp, Winslow, Atsion (H&C), Belleplaine.

Cape May.—South Dennis (S), Court House, Dias Creek, Goshen, Whitesboro, Bennett.

Coast Strip.—Wildwood (H&C).

***Panicum lindheimeri* Nash. Lindheimer's Panic Grass.**

Panicum Lindheimeri Nash, Bull. Torr. Bot. Club. XXIV. 196 [Texas].

Dry ground throughout our region.

Fl.—Mid-June to early August.

Middle District.—Farmingdale, Pemberton Jnc., Haddonfield (S), Medford, Washington Park, Lindenwold, Sicklerville (S), Glassboro (S) Yorktown, Bridgeton (S).

Pine Barrens.—New Lisbon, W. Plains (S), Speedwell (S), Ballinger's Mill, Winslow Jnc. (S), Folsom Twelfth St., Manahawkin, Woodbine, Palermo.

Coast Strip.—Wildwood.

Cape May.—Dias Creek (S), Fishing Creek (OHB).

***Panicum leucothrix* Nash. Glaucous Panic Grass.**

Panicum leucothrix Nash, Bull. Torr. Bot. Club, XXIV. 41. 1897 [Eustis, Lake Co., Fla.]

Sandy ground in the Pine Barrens: apparently not very common.

Fl.—Late June to late August, probably.

Pine Barrens.—Forked River (H&C), Chatsworth, Atsion (H&C), Mouth of Batsto, Absecon (S).

Panicum huachucae Ashe. **Huachuca Panic Grass.**

Panicum huachucae Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 51. 1898
[Huachuca Mts., Arizona].

So far as our material goes this species seems to be restricted to the Middle district and Coastal strip, and the typical form is apparently not common in our region.

The majority of our specimens have been identified by Hitchcock and Chase as *P. h. silvicola*,* but many others are marked as intermediate and the characters are so slight that in practice it seems impossible to recognize them as distinct.

Fl.—Mid-June to late July.

Middle District.—Farmingdale, Sicklerville, Yorktown.

Coast Strip.—Beach Haven (L), Piermont, Cold Spring.

Panicum tennesseense Ashe. **Tennessee Panic Grass.**

Panicum tennesseense Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 52. 1898
[La Vergne Co., Tenn.].

Distribution as in the last.

Fl.—Mid-June to mid-July.

Middle District.—Riddleton, Tabernacle (S).

Coast Strip.—St. Albans (L), Palermo, Piermont, Wildwood.

Panicum meridionale Ashe. **Gray Panic Grass.**

Panicum meridionale Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 59. 1898
[Chapel Hill, N. C.].

Dry ground; abundant in the Pine Barrens, also in the Coast strip and Cape May district.

Starred specimens in the list of localities have been identified by Hitchcock and Chase as *P. albemarlense*, a species which so far as this New Jersey material goes I find it impossible to separate from *P. meridionale*.

Fl.—Mid-June to mid-August.

**Panicum huachucae silvicola* Hitchcock and Chase, Rhodora X. 64. 1908
[District of Columbia].

Middle District.—Ballinger's Mill (S), Medford (S). edge of Bear Swamp, Swedesboro.

Coast Strip.—Sea Bright, Forked River, Spray Beach (L), St. Albans (L), Surf City (L), Beach Haven (L), Barnegat City Jnc. (L), Barrel Island (L), Avalon.

Middle District.—Hornerstown, Grenloch,* Medford* (S).

Pine Barrens.—Allaire, Farmingdale, Lakehurst, Brown's Mills Inc., East Plains, Chatsworth, Ballinger's Mill,* Bear Swamp* (S), Berlin (S), Sicklerville, Landisville, Atsion (H&C), Winslow Jnc., Pancoast, Palermo.

Coast Strip.—Anglesea, Piermont (S), Surf City* (L), N. Beach Haven* (L), Holgates (L), Ship Bottom (L).

***Panicum oricola* Hitch. & Chase. Coast Panic Grass.**

Panicum oricola Hitchcock and Chase, *Rhodora* VIII. 208. 1906 [Lewes, Del.].

Apparently restricted to the Coast strip and Pine Barrens.

Fl.—Early June to mid-August.

Pine Barrens.—Toms River (H&C), Hornerstown, Forked River (H&C), Pasadena, Tuckerton (H&C), Chatsworth, E. Plains (H&C), Millville, Winslow Jnc., Hammonton (H&C), Atsion (H&C), Absecon (H&C).

Coast Strip.—Ship Bottom (L), Spray Beach (L), Surf City (L), Beach Haven (L), Peahala (L), Beach Haven Terrace (L), Atlantic City (H&C).

***Panicum lanuginosum* Ell.† Downy Panic Grass.**

Panicum lanuginosum Elliott, Bot. S. C. and Ga. I. 123. [Georgia].

Restricted to the coastal strip, where it is common along the edge of the salt marshes.

Fl.—Late June to late July.

Coast Strip.—Peahala (L), Beach Haven (L), St. Albans (L), Surf City (L), N. Beach Haven (L), Beach Haven Terrace (L), Palermo, Piermont (S), Anglesea, Wildwood (H&C), Bennett (S).

***Panicum villosissimum* Nash. Wooly Panic Grass.**

Panicum villosissimum Nash, Bull. Torr. Bot. Club XXIII. 149. 1896 [Ocmulgee Swamp, Ga.].

Throughout our region in sandy localities, usually in woods.

Fl.—Early June to early July.

Middle District.—Arneys Mt. (S), Grenloch, Mickleton, Glassboro (S), Sicklerville, Centerton (S), Husted (S), Millville.

**Panicum albemarlense* Ashe, Jour. Elisha Mitch. Sci. Soc. XVI. 84. 1900 [Beaufort and Hyde Cos., N. C.].

† Hitchcock and Chase record *P. auburne* from New Jersey in Gray's Manual, Ed. VII., 1908, p. 111, but apparently repudiate the statement in their subsequent monograph of the genus where they do not know it north of Virginia.

Pine Barrens.—Bear Swamp, Ballinger's Mill, Cedar Brook, Landisville, Inskip, Winslow Jnc., Folsom, Petersburg.

Coast Strip.—Avalon.

Cape May.—Court House (S), Wildwood Jnc. (H&C), Dias Creek, Bennett, Cold Spring (S), Fishing Creek (OHB).

***Panicum pseudopubescens* Nash. Smoothish Panic Grass.**

Panicum pseudopubescens Nash, Bull. Torr. Club XXVI. 577. 1899 [Auburn, Lee Co., Ala.].

One specimen collected by Mr. Benjamin Heritage near Mickleton has been identified as this species by Hitchcock and Chase, and several other records appear in their monograph of the genus. Evidently not common.

Middle District.—Camden (H&C), Mickleton.

Pine Barrens.—Atsion (H&C).

Cape May.—Wildwood Jnc. (H&C).

***Panicum commonsianum* Ashe. Commons' Panic Grass.**

Panicum commonsianum Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 55. 1898 [Cape May Pt., N. J.].

Plentiful in dry ground throughout the Pine Barren and Cape May districts. The type was collected by Mr. Albert Commons, the well known authority on the Delaware flora, at Cape May Point, N. J.

Fl.—Early June to late July.

Pine Barrens.—Farmingdale (S), Lakehurst, Davenport, Toms River (H&C), Whittings, Brown's Mills, New Lisbon, Bamber, Forked River, Pasadena, E. Plains (S), Speedwell, Chatsworth (S), White Horse (S), Tabernacle, head of Batsto River, Clementon, Sumner, Albion, Sicklerville, east of Centerton (S), Vineland (S), Landisville (T), Atsion (H&C), Millville, Twelfth St., Pancoast.

Coast Strip.—Wildwood (H&C).

Cape May.—Cape May Pt. (S).

***Panicum commonsianum addisonii* Nash. Addison Brown's Panic Grass.**

Panicum addisonii Nash, Bull. Torr. Bot. Club XXV. 83. 1898 [Wildwood, N. J.].

Common in dry sandy ground, especially in the Pine Barrens, but locally at least throughout our region.

The type specimen of this species, which is essentially a diminutive of the preceding, was collected by Mr. E. P. Bicknell at Wildwood, May 30, 1897. It is named after Hon. Addison Brown, joint author of the "Illustrated Flora."

So many New Jersey specimens are regarded as intermediate between *commonsianum* and *addisonii* by Hitchcock and Chase, to whom they were submitted, that it seems more reasonable to regard them as sub-species rather than as full species.

Fl.—Early June to late July.

Middle District.—Farmingdale (S), Woodbury, Tomlinson's Medford (S), Lawnside (S), Union Grove (S), Bridgeton (S).

Pine Barrens.—Lakehurst, Toms River (H&C), Whitings, Brown's Mills, E. Plains (S), Tuckerton (H&C), Chatsworth, Albion, Ballinger's Mills, Landisville, Inskip, Atsion (H&C), Mays Landing, Somers Pt. (H&C).

Coast Strip.—Wildwood (H&C), Piermont (S).

Cape May.—Wildwood Jnc. (H&C), Dias Creek (S), Cape May (S).

***Panicum tsugetorum* Nash. Hemlock Panic Grass.**

Panicum tsugetorum Nash, Bull. Torr. Bot. Club XXV. 86. 1898 [N. Y. Botanic Garden].

Casually throughout our region, but most plentiful in the pine woods of the Pine Barrens in company with the two preceding and the following.

Fl.—Early June to late July.

Middle District.—Riverside, Lawnside (S), Medford (S), Glassboro (S), Centerton (S), Bridgeton (S).

Pine Barrens.—Forked River (H&C), Tuckerton (H&C), E. Plains (S), Chatsworth (S), White Horse (S), Atsion (H&C), Pancoast (S), Palermo.

Cape May.—Wildwood Jnc. (H&C), Bennett (S), Court House.

***Panicum columbianum* Scribn. Columbia Panic Grass.**

Panicum columbianum Scribner, Bull. VII. Div. Agrost. U. S. Dept. Agr. 78. 1897 [N. Eng. to Carolinas, Tenn. and Ala.].—Keller and Brown 37.

Panicum psammophilum Nash, Bull. Torr. Bot. Club XXVI. 576. 1899 [Toms River, N. J.].

Dry sandy woods of the Pine Barrens and casually in the Middle, Cape May and Coast districts.

Fl.—Early June to late July.

Middle District.—Shark River, Grenloch, Lawnside.

Pine Barrens.—Allaire (S), Farmingdale (S), Lakehurst (H&C), Toms River (H&C), Brown's Mills, New Lisbon, Tuckerton (H&C), E. Plains, Chatsworth, Atco, Sicklerville, Atsion (H&C), Folsom, Pancoast, Palermo.

Coast Strip.—Anglesea, Wildwood (H&C).

Cape May.—Court House.

***Panicum columbianum thinium* Hitch & Chase.**

Panicum unciphyllum thinium Hitchcock and Chase. Rhodora VIII. 209.
[Toms River, N. J.]

Distribution similar to the last, from which it is perhaps hardly separable.

Fl.—Early June to late July.

Middle District.—Lawnside (S), Mantoloking (H&C).

Pine Barrens.—Toms River (H&C), Forked River (H&C), Chatsworth (S), Bear Swamp (S), Atsion (H&C), Tuckerton (H&C), Palermo, Egg Harbor City.

Coast Strip.—Ocean City (S).

Cape May.—Court House (S).

***Panicum ensifolium* Baldwin. Britton's Panic Grass.**

Panicum ensifolium Baldwin, in Elliott Flor. S. Car. & Ga. I. 126. 1817 [Georgia].

Panicum Brittoni Nash, Bull. Torr. Bot. Club XXIV. 194. 1897 [Forked River, N. J.].

Boggy or wet sandy ground in the Pine Barren and Cape May districts, and locally in west Jersey.

This is the most delicate species after *P. wrightianum*. It was first collected in New Jersey by Dr. N. L. Britton at Forked River, in 1896, and as it was at that time thought to be a new species, Mr. Nash named it in honor of the collector.

Fl.—Early June to mid-July.

Middle District.—Lawnside (S).

Pine Barrens.—Allaire, Pt. Pleasant, Toms River (H&C), Forked River, Manahawkin, Penn Place (H&C), Atsion (H&C), Chatsworth, Speedwell, Pancoast.

Cape May.—Cold Spring.

***Panicum sphærocarpon* Ell. Round-fruited Panic Grass.**

Panicum sphærocarpon Elliot, Flor. of S. Car. & Ga. I. 125. 1817 [Georgia]. Britton 281.—Keller and Brown 37.

Sandy ground; locally in northern New Jersey and common throughout our region. One of the most uniformly distributed and easily recognized species, the small round spikelets, broad, short and stiff leaves being particularly characteristic.

Fl.—Mid-June to mid-August.

Middle District.—Medford, Lawnside (S).

Pine Barrens.—Farmingdale (S), Forked River, Tuckerton, New Lisbon, White Horse, Chatsworth, Speedwell (S), Atco, Pancoast (S), Palermo, Dennisville (S).

Coast Strip.—Spray Beach (L), Peahala (L), Barnegat City Jnc. (L), Beach Haven (L), St. Albans (L), Surf City (L), Barrel Isl. (L), Longport (S), Avalon, Piermont, Wildwood.

Cape May.—Wildwood Jnc., Bennett, Cold Spring (S), Green Creek (S), Cape May (H&C).

***Panicum polyanthes* Schultes. Small-fruited Panic Grass.**

Panicum polyanthes Schultes, Mant. II. 257. 1824. New name for *P. multiflorum* Ell. [nec. Poir] [S. Carolina].

Panicum microcarpon Britton 281.

Damp shady ground, apparently not very common in our region, and found only in the Middle and Cape May districts.

Fl.—Late June to mid-July. Secondary panicles very rare.

Middle District.—Sea Bright, Camden Co. (C), Pemberton Jnc. (S), Medford (S), Ballinger's Mill (S), Yorktown, Maple Shade.

Cape May.—Bennett.

***Panicum commutatum* Schultes. Variable Panic Grass.**

Panicum commutatum Schultes, Mant. III. 24. 1824 [Carolina and Georgia].

Our only record is at Bennett, Cape May Co., where I collected it June 30, 1909.

Fl.—Early June to late July.

Cape May.—Bennett (S).

***Panicum ashei* Pearson. Ashe's Panic Grass.**

Panicum Ashei T. G. Pearson, in Ashe Jour. Elisha Mitch. Sci. Soc. XV. 35. 1898 [Wilmington, N. C.].

Plentiful in dry sandy woodland of the Pine Barrens and Cape May districts, and less abundant in the Middle district and Coast strip.

The early forked branching and general smooth rigid appearance are characteristic of this species, as is the frequent purplish coloration.

Fl.—Late May to mid-July, rarely later.

Middle District.—Shark River, Woodbury, Glassboro (S), Sewell (S), Bridgeton (S), Yorktown.

Pine Barrens.—Bamber, Waretown, Tuckerton (H&C), Albion (S), Sicklerville, Landisville, Millville, Atsion (H&C), Winslow Jnc., Folsom, Egg Harbor City (H&C), Pancoast, Petersburg, Dennisville (S).

Coast Strip.—Wildwood (H&C).

Cape May.—Court House, Wildwood Jnc (H&C), Bennett (S), Whitesboro (S).

***Panicum scribnerianum* Nash. Scribner's Panic Grass.**

Panicum scribnerianum Nash, Bull. Torr. Bot. Club XXII. 421. 1895.

New name for *P. scoparium minor* Scrib. [nee *P. capillare minor* Muhl.]

[Wysox, Pa.].—Keller and Brown 37.

Panicum scoparium Button, 280.

Restricted to the Middle district and certain localities in the northern counties. Locally common in dry, sandy ground. Named for Prof. F. Lamson Scribner, the well known agrostologist, who was for some years an active student of the flora of Philadelphia and vicinity and who first mounted and arranged the North American grasses in the herbarium of the Philadelphia Academy.

Fl.—Late May to early July.

Middle District.—Crosswicks Creek, Delanco, Riverside, Woodbury, Grenloch, Lawnside (S), Collingswood (S), Medford (S), Mt. Holly, Swedesboro.

***Panicum oligosanthes* Schultes. Few-fruited Panic Grass.**

Panicum oligosanthes Schultes, Mant. II. 256. 1824. [New name for *P. pauciflorum* Ell.—Georgia].

Known only from the Middle, Pine Barren and Cape May districts, where I have collected it in sandy soil at several localities. Previously it was not known north of Delaware.

Fl.—Early June to mid-July.

Middle District.—Medford, Lawnside (S).

Pine Barrens.—Atsion (H&C).

Cape May.—Bennett.

***Panicum scoparium* Lam. Velvety Panic Grass.**

Panicum scoparium Lamark, Encycl. VII. 744. 1797 [S. Carolina].—Keller and Brown 37.

Panicum viscidum Britton 281.

Common in moist ground along the entire coast marshes and up the Delaware River at least to Camden, following the larger streams into the limits of the Middle and Pine Barren districts at several points.

Its large size and dense velvety pubescence serve to distinguish it.

Fl.—Early July to late August.

Middle District.—Kaighns Pt., National Park, So. Westville, 8 miles west Mickleton, Centerton (S), Bridgeton (S), Dividing Creek.

Pine Barrens.—Williamstown Jnc., Winslow Jnc., Folsom, Woodbine (S), Dennisville.

Coast Strip.—Avon (H&C), Pt. Pleasant, Manahawkin, Spray Beach (L), Tuckerton (H&C), Palermo, Ocean City, Estelville, Mays Landing (S), Anglesea, Wildwood (H&C), Peermont (S), Manumuskin (S).

Cape May.—Cold Spring, Court House, Cape May.

***Panicum cryptanthum* Ashe. Sheathed Panic Grass.**

Panicum cryptanthum Ashe, N. C. Agr. Sta. Bull. 175, 115. 1900 [Wilson's Mill, N. C.].

Known only from Twelfth St. (Folsom), Atlantic Co., near where it crosses Hospitality Branch in the Pine Barrens. It was collected here July 27, 1909, by Mr. Bayard Long, and thereby its range was extended far northward.

Hitchcock and Chase* have recorded this specimen as from Atlantic City, a locality thirty miles to the east in a totally different floral district.

Pine Barrens.—Twelfth St. Folsom.

***Panicum aculeatum* Hitchcock & Chase. Chase's Panic Grass.**

Panicum aculeatum Hitchcock and Chase, Rhodora VIII. 209. 1906 [Tacoma Park, D. C.].

Just as the work is passing through the press Mr. O. H. Brown sends a *Panicum* from Cape May, which agrees in all respects with this species, except that the spikelets are a little smaller and the leaves shorter than a specimen from the District of Columbia collected by Mr. House. If not identical it represents a form exceedingly close to *P. aculeatum*. Mr. Long has apparently the same thing from Albion, September 7, 1910.

***Panicum scabriusculum* Ell. Elliot's Panic Grass.**

Panicum scabriusculum Elliot, Bot. S. C. and Ga. I. 121 [Savannah].

Confined to moist ground in the Pine Barrens. First discovered in the State by Mr. Bayard Long on Hospitality Branch, where it crosses Twelfth St. (Folsom), July 27, 1909.

Not previously known from north of Virginia.

Fl.—Early July to mid-August.

* N. A. *Panicum*. Contrib. U. S. Nat. Herb. 15, p. 299.

Pine Barrens.—Twelfth St. Hospitality Branch, Pleasant Mills, N. of Atsion.

***Panicum clandestinum* L. Hispid Panic Grass.**

Panicum clandestinum Linnæus, Sp. Pl. 58. 1753 [Pennsylvania].—Britton 280.

Swampy thickets; common in the northern counties and also in the Middle district and Coast strip all the way to Cape May, but not recorded from the Pine Barrens.

Fl.—Mid-June to early September.

Middle District.—Farmingdale, New Egypt, Delanco, Hartford, Fish House, Haddonfield (S), Medford, Ballinger's Mill (S), Lawnside (S), Woodbury, Tomlin, Albion, Swedesboro, Yorktown, Centerton (S).

Coast Strip.—Sandy Hook (NB), Toms River, Manahawkin, Ocean City (S), Piermont, Wildwood (H&C), Holly Beach (UP).

Cape May.—Court House, Cold Spring.

***Panicum boscii* Poir. Porter's Panic Grass.**

Panicum Boscii Poiret, in Lam. Encycl. Suppl. IV : 278. 1816 [Carolina].

Casual in the Middle district and probably common in the northern counties. While some specimens present more pubescence than others, none seem worthy of separation under *P. b. molle*.

Fl.—Early June to early August.

Middle District.—Westville, Medford, Swedesboro, Fairton.

Cape May.—Bennett, Cape May.

***Panicum latifolium* L. Broad-leaved Panic Grass.**

Panicum latifolium Linnæus, Sp. Pl. 58. 1753 [America].—Britton 280.

Panicum macrocarpon Le Conte, Torrey Cat. 91. 1819.—Keller and Brown 38.

Edges of woods, dry ground; common in the northern part of the State, but rare within our region and confined to the Middle district.

Fl.—Early June to mid-July.

Middle District.—Mickleton.

SACCIOLEPIS Nash.

***Sacciolepis striata* (L.). Gibbous Panic Grass.**

Holcus striatus Linnæus, Sp. Pl. 1048. 1753 [Virginia].

Sacciolepis gibba Stone, Proc. Acad. Nat. Sci., Phila., 1908, p. 456.

Confined to the lower part of the Cape May peninsula, growing in moist soil. This species was discovered on the border of Lily Lake, Cape May Point, in September, 1905, by Mr. C. S. Williamson. It was not previously known from north of Virginia.

Fl.—Early August into October.

Cape May.—Cape May Pt.

ECHINOCHLOA Beauvois.

Echinocloa walteri (Pursh). Salt-Marsh Cockspur Grass.

Pl. XI., fig. 3.

Panicum Walteri Pursh, Fl. Am. Sept. I. 66. 1814 [Canada and New York near salt water].

Panicum Crus-galli hispidum Knieskern 40.—Britton 282.

Common along the edge of salt marshes on the entire coast and introduced at a few spots in west Jersey. Distinguished from the common weed "Barnyard Grass" *E. Crus-galli* (L.) by its much larger head and longer bristles.

Fl.—Late August to early October.

Middle District.—Clementon.

Maritime.—Seaside Park (Ha), Forked River, Barnegat City (L), Harvey Cedars (L), Beach Haven (L), Ocean City (S), Tuckahoe (S), Sea Isle City (S), Avalon, Cape May, Dennisville (S).

CHÆTOCHLOA Scribner.

Key to the Species

- a. Bristles downwardly barbed, spikes adhering to one's clothing. [*C. verticillata*]*
- aa. Bristles upwardly barbed.
 - b. Spike 20–50 cm. long, green. *C. magna*, p. 213
 - bb. Spike 10–20 cm. long, purplish. [*C. italica*]†
 - bbb. Spike less than 15 cm. long.
 - c. Annual, with merely a tuft of slender rootlets.
 - d. Bristles green, spikelets 2 mm. long. [*C. viridis*]‡
 - dd. Bristles tawny yellow, spikelets 2.5–3 mm. [*C. glauca*]§
 - cc. Perennial, with a creeping root stalk.
 - d. Culms tufted, green or purplish. *C. imberbis*, p. 213

* Barbed Foxtail Grass. A weed about dwellings.

† Millet. Cultivated and escaped in waste ground.

‡ Green Foxtail Grass. A common weed.

§ Yellow Foxtail Grass. A common weed.

dd. Culms not tufted, bristles and tips of spikelets purplish.

Coast plant.

C. i. versicolor, p. 213

***Chætochloa imberbis* R. & S. Native Fox-tail Grass.**

Pl. XI., Fig. 5.

Setaria imberbis Roemer and Schultes, Syst. II. 891 [N. A. and Brazil].

Moist ground in the Middle district; probably more common than our collections would indicate, as it has been confused with the introduced species *C. glauca* and *C. viridis*, so common about cultivated ground. It can be told at once by the creeping root-stalk, being a perennial, while the others are annuals.

Fl.—Mid-July to late September.

Middle District.—Pemberton Inc. (S), Delanco, Camden.

***Chætochloa imberbis versicolor* (Bicknell). Coast Fox-tail Grass.**

Chætochloa versicolor Bicknell, Bull. Torr. Club. 25. Feb., 1898. p. 105 [Van Courtland Park, N. Y.].

Common along the edges of the salt marshes on the coast as well as on the bay shore of Cape May at least as far as Dias Creek.

Fl.—Mid-July to late September.

Maritime.—Seaside Park, Forked River, Manahawkin, Surf City (L), Barnegat City (L), St. Albans (L), Peahala (L), Beach Haven Terrace (L), Sherburn's (L), Beach Haven (L), Cedar Bonnet (L), Absecon (S), Atlantic City, Ocean City, Palermo, Cape May Court House, Cape May, Dias Creek.

***Chætochloa magna* (Griseb.). Giant Fox-tail Grass.**

Setaria magna Grisebeck, Fl. Brit. W. Indies. 1861. 554 [Jamaica].

Found on the edge of the salt marshes near the Cape May Point lighthouse, in September, 1891, by the writer, but not seen there in recent years. Re-discovered September, 1911, on the ocean side of the peninsula, below Cold Spring, by Mr. O. H. Brown. There is also a specimen in the Academy from the W. Wynne Wister herbarium labeled "N. J. 1863."

Fl.—Late July to late September or into October.

Maritime.—Wildwood (UP), Cape May Pt. (S), Near Cold Spring.

CENCHRUS L.

Key to the Species.

a. Bur-like involucre, 8 mm. thick, short, pubescent. *C. carolinianus*, p. 214

aa. Bur-like involucre, 12-14 mm. thick, densely long, pubescent.

C. tribuloides, p. 214

Flowering Data.—Time of year indicates the season during which well developed involucre and intact racemes are present.

***Cenchrus carolinianus* Walt. Hedgehog Grass. Sand Bur.**

Pl. XV., Fig. 6.

Cenchrus carolinianus Walter, Flor. Carolina, 79. 1788 [Carolina, probably].

Cenchrus tribuloides Knieskern 40.—Britton 282 (in part).—Keller and Brown 39.

Cenchrus echinatus Muhlenberg, Cat. 7. 1813.—Barton Flora Phila. I. 38. 1818.—Muhlenberg Gram. 51. 1817.—Torrey Fl. U. S. I. 68. 1824.

Common in sandy soil throughout our region, extending into the Northern district along the Delaware and in Bergen Co., according to Britton.

The character of the occurrence of this grass would seem to indicate that it was not originally found in the Pine Barrens or Coast region, but has entered from the surrounding areas.

Fl.—Mid-July to late September.

Middle District.—New Egypt, Delanco, Camden, Blackwood, Washington Park (S). Swedesboro.

Pine Barrens.—Landisville, Twelfth St., Absecon (S).

Coast Strip.—Beach Haven (L).

Cape May.—Court House (S), Goshen (S), Dias Creek.

***Cenchrus tribuloides* L. Coast Sand Bur.**

Cenchrus tribuloides Linnæus, Sp. Pl. 1050. 1753 [Coast of Virginia].—

Muhlenberg, Cat. 7. 1813.—Pursh Fl. Am. Sept. I. 60. 1814.—Muhlenberg Gram. 52. 1817.—Torrey Fl. U. S. I. 69. 1824.

Cenchrus macrocephalus Keller and Brown 39.

Common on sand dunes along the lower half of the coast.

Fl.—Mid-July to mid-September.

Maritime.—Surf City (L), Tucker's (L), Beach Haven (L), Holgate's (L), St. Albans (L), Spray Beach (L), Atlantic City, Longport (S), Ocean City, Stone Harbor (S), Anglesea, Wildwood, Cape May (OHB).

ZIZANIA L.

***Zizania palustris* L. Wild Rice.**

Zizania palustris Linnæus, Mantissa II. 295. 1771 [North America].

Zizania aquatica Knieskern 37.—Barton Fl. Phila. II. 168. 1818.—Britton 283.

Plentiful in water along the larger rivers and swamps of the Middle and Cape May districts and the Coastal strip, running well up into the Pine Barrens along the principal water courses, but not strictly speaking, a member of the Pine Barren flora.

This is the Wild Rice which covers the broad marshes of the Delaware as well as those of Newark and Hackensack, associated with Cat-tails, *Spartina* and *Phragmites*. By the latter part of July it is in full flower, and the drooping sprays of staminate flowers and broad green leaves remind one of a field of narrow leaved corn. In September it has become the shelter of thousands of reed birds and rail, and the gunners soon begin to beat and trample it down in pursuit of their game. The storms of autumn complete the work and by winter the acres of swaying and fluttering foliage are reduced to a dense brown mat which covers the marsh, and through which, in the following spring, the tender green sprouts of the next year's crop push their way and once again give color to the meadows.

The Rice sometimes follows the course of small streams for many miles back from the rivers or coast. I have found it on Cooper's Creek, twelve miles from its mouth, while it follows the larger streams as far as the head of tidewater. Very often a dam makes a sharp line of demarkation between the tidewater and Pine Barren floras, as at Toms River, Batsto, Mays Landing, Millville, etc., and checks abruptly the range of the Wild Rice.

Fl.—Mid-July through August, spikelets soon dropping.

Middle District.—New Egypt, Pemberton (NB), Fish House, Oaklyn (S), Mickleton, Swedesboro, Salem (S).

Coast Strip.—Metedeconk River (NY), Toms River (S), Forked River, Weekstown, Forks of Batsto, Mays Landing.

Cape May.—Cold Spring (OHB), New England Creek (OHB).

HOMALOCENCHRUS Mieg.

a. Spikelets 2.5–3 mm. long, greenish, panicle branches rigid.

H. virginicus, p. 215

aa. Spikelets 4–5 mm. long, whitish, panicle branches drooping.

H. oryzoides, p. 216

Homalocenchrus virginicus (Willd.). White Grass.

Leersia virginica Willdenow, Sp. Pl. 1. 325. 1797 [North America].—Barton, Fl. Phil. I. 41. 1818.—Knieskern 37.

Homalocenchrus virginica Britton 283.—Keller and Brown 39.

Common in damp shady spots in the Middle and Cape May districts.

Fl.—Late July to early September, spikelets of exserted panicles soon dropping.

Middle District.—Sea Bright (NY), New Egypt, Hartford, Merchantville (KB), Delaire, Oaklyn (S), Springdale (S), Mickleton (NY), Washington Park (S), Swedesboro, Woodstown (KB), Salem (S).

Cape May.—Whitesboro, Green Creek (S), Sluice Creek (S).

Homalocenchrus oryzoides (L.). Rice Cut-Grass.

Pl. VII., Fig. 4.

Phalaris oryzoides Linnæus, Sp. Pl. 55. 1753 [Virginia].

Homalocenchrus oryzoides Britton 284.

Leersia oryzoides Barton, Fl. Phil. I. 41. 1818.—Knieskern 37.

Common in wet swamps throughout, except in the Pine Barrens, where it occurs only as an intrusion from the coast.

Fl.—Early August to mid-September, spikelets of exserted panicles soon dropping.

Middle District.—New Egypt, Delanco (S), Hartford, Camden (P), Oaklyn (S), Lawnside (S), Springdale (S), Lindenwold (S), Clementon, Albion, Tomlin, Salem (S), Dividing Creek.

Coast Strip.—Bay Head (NY), Barnegat City (L), Manahawkin, 4 mi. E. of Hammonton (S), Forks of Batsto, Mays Landing (S), Piermont (S), Wildwood (UP).

Cape May.—Seaville (S), 3 mi. W. of Court House (S), Cape May (OHB).

PHALARIS L.

***Phalaris arundinacea* L. Reed Canary Grass.**

Pl. X., Fig. 3.

Phalaris arundinacea Linnæus, Sp. Pl. 55. 1753 [Europe].—Britton 285.

Frequent in open swamps in the northern counties, extending into the upper part of the Middle district.

Fl.—Early June to early July.

Middle District.—Pt. Pleasant, New Egypt, Delair, Pemberton Jnc. (S), Mickleton, Swedesboro.

SAVASTANA Schrank.

***Savastana odorata* (L.). Holy Grass.**

Holcus odoratus Linnæus, Sp. Pl. 1048. 1753 [Europe].

Hierochloa borealis Willis 76.—Torrey Flor. U. S. 150. 1824.—Knieskern 39.

Hierochloa odorata Britton 285.

Savastana odorata Keller and Brown 39.

Rather common along the edge of the salt marshes of the coast, especially where they join the first low thickets of the upland. Reported from Salem, but we have no other records for the bay shore.

The coastal strip seems to have a much later awakening in spring time than the western part of the State, and when the gray-green is beginning to tinge the landscape of the lower Delaware valley the shore marshes are still wrapped in the dull brown of winter. Even then, however, careful search will disclose the little brownish spikes of the Holy Grass pushing through the sod and unfurling their sprays of yellow anthers to the cold winds that still sweep in from the ocean. The long narrow glossy leaves come later and do not attain their full growth until the flower stalk has dried up.

The Lake Como specimen has been identified as *S. nashii*, but the form does not appear separable.

Fl.—Late April to late May. Panicles appear in early April and after flowering become dry and persist until midsummer.

Maritime.—Sea Bright (C), Lake Como, Squan (C), Pt. Pleasant (KB), Bay Head, Surf City (L), Barnegat City (L), Beach Haven Terrace (L), Anglesea (H), Cape May Ct. House, Cape May, Salem.

Also a specimen collected by J. H. Grove in a roadside near Lakehurst, July 23, 1808, perhaps introduced.

ARISTIDA L.

Key to the Species.

- a. Awns twisted together spirally below the middle. *A. tuberculosa*, p. 218
- aa. Awns separate to the base.
 - b. Middle awn coiled at the base, lateral awns very short. *A. dichotoma*, p. 217
 - bb. Middle awn not coiled at the base.
 - c. Middle awn 35-70 mm. long, lateral awns not much shorter. *A. oligantha*, p. 218
 - cc. Middle awn less than 25 mm. long.
 - d. Lower sheaths densely wooly. *A. lanosa*, p. 219
 - dd. Sheaths glabrous.
 - e. 3-8 dm. tall, panicle dense. *A. purpurascens*, p. 218
 - ee. 1.5-5 dm. tall, panicle slender. *A. gracilis*, p. 218

Aristida dichotoma Michx. Poverty Grass.

Pl. VIII., Fig. 9.

Aristida dichotoma Michaux, Fl. Ber. Am. I. 41. 1803 [Lincoln, N. Car.]—Knieskern 38.—Britton 286.

Dry ground throughout the State.

Fl.—Late August to early October.

Middle District.—Keyport (NB), New Egypt, Fish House (S), Orchard (S), Westmont (S), Medford (S), Mickleton, Swedesboro.

Pine Barrens.—Waretown, Absecon, Atsion, Landisville, Mays Landing, Palermo (S).

***Aristida gracilis* Ell. Slender Poverty Grass.**

Pl. VIII., Fig. 4.

Aristida gracilis Elliott, Bot. S. C. and Ga. I. 142. 1817 [Charleston, S. C.]—Knieskern 38.—Gray Man. Ed. I. 584. 1848.—Britton 286.

Dry ground throughout the State, often growing with the last.
Fl.—Early August to early October.

Middle District.—New Egypt, Crosswicks, Medford, Clementon, Taunton.

Pine Barrens.—Atsion, Mays Landing.

Coast Strip.—Forked River, Spray Beach (L), Sherburn's (L).

Cape May.—Green Creek (S).

***Aristida tuberculosa* Nutt. Beach Poverty Grass.**

Aristida tuberculosa Nuttall, Genera I. 57. 1818 [Augusta, Ga.]—Knieskern 38.—Willis 73.—Gray Man. Ed. I. 585. 1848.—Britton 286.—Keller and Brown 40.

Sandy ground along the upper coast or inland therefrom, where it has possibly followed the railroads. It occurs at South Amboy to the north of our limits.

Fl.—Late August to late September.

Middle District.—Middletown Pt., Keyport (NB).

Pine Barrens.—Pasadena (introduced along railroad).

Coast Strip.—Sandy Hook (NB), Waretown, Toms River.

***Aristida oligantha* Michx. Few-flowered Poverty Grass.**

Aristida oligantha Michaux, Fl. Bor. Am. I. 41. 1803 [Prairies of Illinois].

Dry sandy ground in the lower part of the Middle district; first obtained at Swedesboro by Mr. C. D. Lippincott. I am inclined to believe that this species has been introduced from the Mississippi Valley.

Fl.—Late August to early October.

Middle District.—Fenwick, Clementon, Mickleton, Swedesboro.

***Aristida purpurascens* Poir. Purplish Poverty Grass.**

Pl. XII., Fig. 2.

Aristida purpurascens Poiret in Lamark Encycl. Suppl. I. 452. 1810 [Carolina].—Knieskern 38.—Torrey Flora U. S. I. 81. 1824.—Britton 286.

Locally in the northern counties and locally common in dry sandy ground throughout our region.

Fl.—Late August to early October.

Middle District.—New Egypt, Freeman's, Medford (S), Haddonfield (S), Clementon, Lawnside (S), Washington Park (S), Woodbury, Tomlin, Paulsboro (H).

Pine Barrens.—Pasadena, Batsto, Albion, Atco, Atsion, Cedar Lake, Landisville, Malaga (S), Mays Landing (C).

Coast Strip.—Cox's, Seaville, Piermont, Anglesea.

Cape May.—Court House (S), Anglesea Jnc., Bennett.

***Aristida lanosa* Muhl. Woolly Poverty Grass.**

Aristida lanosa Muhlenberg, Gram. 174. 1817 [Carolina].

Dry sandy ground, locally in the Middle and Cape May districts. First detected at Medford by Mr. Stewardson Brown and the writer. Previously apparently confused with the preceding.

Fl.—Early August to mid-September.

Middle District.—Locust Grove (S), Medford (S), Lindenwold (S).

Cape May.—Town Bank (S).

STIPA L.

***Stipa avenacea* L. Black Oat Grass.**

Pl. VI., Fig. 3.

Stipa avenacea Linnæus, Sp. Pl. 78. 1753 [Virginia].—Muhlenberg Gram. 181. 1817.—Torrey Fl. U. S. I. 80. 1824.—Knieskern 38.—Britton 286.—Keller and Brown 40.

Stipa bicolor Barton, Fl. Phil. I. 54. 1818.

Locally in Bergen and Passaic counties and common in dry sandy ground in the Middle district; less common in other parts of our region.

A striking grass with its long twisted awns.

Fl.—Late May to early June. Fruit matures very rapidly and immediately drops.

Middle District.—Phalanx (NY), Farmingdale, Brindletown, Browns Mills, Kaighns Pt., Westville (P), Sewell, Glassboro, Medford (S), Albion, Sickler-ville, Berlin, Lindenwold, Mickleton, Swedesboro, Millville (S).

Pine Barrens.—Lakehurst, Landisville, Newtonville, Winslow Jnc., White Horse (P), Mays Landing, Palermo. (Probably none of these typical Pine Barrens.)

Cape May.—Dennisville (OHB), Cape May, Cold Spring.

MUHLENBERGIA Schreber.

Key to the Species.

- a. Panicle purplish, open and diffuse, each spikelet on a filiform pedicel and with a hair-like awn. *M. capillaris*, p. 221
- aa. Panicle contracted, spike-like or exceedingly slender and appressed, culms branched.
 - b. Flowering scales not awned. *M. mexicana*, p. 220
 - bb. Flowering scales awned.
 - c. Panicles not dense and cylindrical.
 - d. Outer scales equal in length to the flowering scale. *M. sylvatica*, p. 220
 - dd. Outer scales about two-thirds as long as the flowering scale. *M. tenuiflora*, p. 221
 - ddd. Outer scales minute, less than one-third as long as the flowering scale. *M. diffusa*, p. 221
 - cc. Panicles dense and cylindrical, spike-like. *M. foliosa*, p. 220

Muhlenbergia foliosa Trin. Leafy Muhlenbergia.

Muhlenbergia foliosa Trinius, Gram. Unifl. 190. 1824 [Pennsylvania].

Bogs of the Middle district; rare (probably also northward), only known from Lindenwold, where it was discovered by the writer September 20, 1910, and was fairly plentiful in good condition.

Fl.—Late August to early October.

Middle District.—Lindenwold.

Muhlenbergia mexicana (L.). Meadow Muhlenbergia.

Pl. VII., Fig. 3.

Agrostis mexicana Linnaeus, Mant. I. 31. 1767 [America].—Barton, Fl. Phila. I. 42. 1818.

Muhlenbergia mexicana Knieskern 37.—Britton 287.

Throughout the northern counties; south locally in the Middle district and on the coast.

Fl.—Mid-August to late September.

Middle District.—New Egypt, Birmingham, Delair, Swedesboro.

Coast Strip.—Barnegat.

Muhlenbergia sylvatica (Torr.). Wood Muhlenbergia.

Agrostis sylvatica Torrey, Fl. U. S. I. 87. 1824 [Mountains of N. J.].

Muhlenbergia sylvatica Knieskern 37.—Britton 287.

Northern counties in shady moist ground, and reported from Monmouth and Ocean counties by Knieskern.

Pine Barrens.—Landisville (T), probably introduced.

Muhlenbergia tenuiflora (Willd.). Slender Muhlenbergia.

Agrostis tenuiflora Willdenow, Sp. Pl. I. 364. 1798 [North America].

Muhlenbergia tenuiflora Knieskern 37.—Britton 287.—Keller and Brown—41.

Shady ground; frequent in the northern counties and rare in the Middle district. Reported by Knieskern from Ocean and Monmouth Counties.

Fl.—Late July to mid-September.

Middle District.—Swedesboro.

Muhlenbergia diffusa Willd. Nimble Will.

Muhlenbergia diffusa Willdenow, Sp. Pl. I:320. 1797 [Pennsylvania].—

Knieskern 37.—Torrey, Fl. N. Y. 15. 1819.—Britton 287.

Frequent in dry shady ground in the northern counties and occasionally southward in the Middle district and Coastal Strip.

Fl.—Late August to late September.

Middle District.—New Egypt, Birmingham, Swedesboro, Mickleton (H).

Coast Strip.—Forked River, Anglesea, Cape May (OHB).

Muhlenbergia capillaris (Lam.) Long-awned Hair-Grass.

Stipa capillaris Lamark, Tabl. Encycl. I. 158. 1791 [Carolina].

Stipa sericea Pursh, Fl. Am. Sept. I. 73. 1814.

Agrostis sericea Muhlenberg Cat. 10. 1813.—Muhlenberg Gram. 64. 1817.

Willis 72.

Trichochloa capillaris Torrey, Fl. U. S. I. 93. 1824.

Muhlenbergia capillaris Britton 287.

Rare and local; occurs also in Hudson Co., at Snake Hill and Little Snake Hill.

Fl.—Probably during September.

Middle District.—Woodbury.

Pine Barrens.—Eighth St., Hammonton.

BRACHYELYTRUM Beauvois.

Brachyelytrum erectum Schreb. Brachyelytrum.

Pl. X., Fig. 5.

Muhlenbergia erecta Schreber, Besch. Gras. II. 139 pl. 50. 1810 [Mts. of

Penna.].—Barton, Fl. Phila. I. 40. 1818.

Brachyelytrum aristatum Knieskern 37.—Willis 72.—Britton 287.

Frequent in rocky woods in the northern counties and occasionally in the Middle district.

Fl.—Early July to late July.

Middle District.—Shark River (C), Pt. Pleasant (S), Haddonfield (P), Mickleton (NB), Swedesboro.

ALOPECURUS.

Alopecurus geniculatus aristulatus (Michx.). Marsh Fox-tail.

Pl. VIII., Fig. 7.

Alopecurus aristulatus Michaux, Fl. Bor. Am. I.: 43. 1803 [Canada].

Alopecurus subaristatus Barton, Fl. Phila. I. 47. 1818.—Nuttall, Gen. II. 52. 1818.

Locally in swampy ground in the Northern and Middle districts.

Fl.—Late May to early July.

Middle District.—Red Bank, Swedesboro (CDL).

SPOROBOLUS R. Brown.

Key to the Species.

- a. Panicles contracted and spike-like, leaves with an attenuated involute tip.
- b. Panicle terminal, upper sheaths 75 mm. long or more.
- c. Two middle scales of the spikelet very unequal, attenuate.

S. clandestinus, p. 223

- cc. Two middle scales of the spikelet nearly equal, blunt.

S. asper, p. 223

- bb. Panicles terminal and lateral, upper sheaths not over 35 mm. long.

S. vaginæflorus, p. 222

- aa. Panicles diffuse, grayish, branches capillary, spikelets very minute.

- b. Base of plant flattened, leaves folded longitudinally.

S. torreyanus, p. 223

- bb. Base of plant not flattened, leaves flat.

S. serotinus, p. 223

Sporobolus vaginæflorus (Torr.). Sheathed Rush Grass.

Pl. XIV., Fig. 3.

Vilfa vaginæflora Torrey, A. Gray, Gram. & Cyp. No. 3. 1834 [Pennsylvania].

Sporobolus vaginæflorus Britton 288.

Dry ground, northern counties, and rarely south to the Middle District.

Fl.—Early September to early October.

Middle District.—Red Bank Mon. Co. (NB), Pt. Pleasant (McK), Birmingham, Mickleton (NB), Swedesboro.

Pine Barrens.—Landisville (T), incursion from Middle District.

Cape May.—Bennett.

Sporobolus asper (Michx.). Long-leaved Rush Grass.

Agrostis aspera Michaux, Fl. Bor. Am. I. 52. 1803 [Illinois].

Cape May district, rare.

This grass was unknown from the State until discovered by Mr. O. H. Brown, near Cape May City. It is rather remarkable that it has not been found in the Middle or Northern districts.

Fl.—Late August to late September.

Cape May.—Cape May.

Sporobolus clandestinus (Spreng.). Rough Rush Grass.

Pl. XIV., Fig. 4.

Agrostis clandestina Sprengel, Mant. Fl. Hal. 32. 1807 [Pennsylvania].

Sporobolus asper Britton 288.

Vilfa aspera Knieskern 37.

Sandy ground, casual in the Northern and more plentiful in the Middle and Cape May districts.

Fl.—Early August to late September.

Middle District.—New Egypt, Birmingham, Medford (S), Mickleton (NB), Swedesboro.

Coast Strip.—Waretown.

Cape May.—Bennett, Cold Spring (S), Town Bank.

Sporobolus torreyanus (R. & S.). Torrey's Dropseed.

Agrostis torreyana Roemer and Schultes, Mantissa II. 203 [Swamps of N. J.].—new name for *Agrostis compressa* Torrey nec Willd.—[Pine Barrens N. J.].

Agrostis compressa Torrey Fl. N. Y. 15. 1819—Torrey Fl. U. S. I. 88. 1824.

Sporobolus compressus Willis Cat. N. J. Plants 72. 1878—Britton 288.

Sporobolus torreyanus Keller and Brown 43.

Bogs of the Pine Barrens and the Cape May peninsula; frequent.

Fl.—Mid-August to late September.

Pine Barrens.—Ancora (P), Atsion, Main Road Sta. (T), Parkdale (S), Speedwell (S), Hammonton, Egg Harbor City.

Cape May.—Court House (S), Bennett.

Sporobolus serotinus (Torr.). Late-flowering Dropseed.

Pl. XIII., Fig. 4.

Agrostis serotina Torrey, Fl. U. S. I. 88. 1824 [Pine Barrens of New Jersey].

Poa uniflora var. *capillaris* Muhlenberg, Cat. II. 1813.

Sporobolus serotinus Knieskern 37.—Willis 72.—Gray Man. Ed. I. 577. 1848.—Britton 288.—Keller and Brown 43.

Pine Barren bogs common, also locally in swamps in the Middle district.

This and the preceding are exceedingly delicate little grasses characteristic of the Pine Barren bogs, and occurring outside this district only in those so-called Pine Barren islands which are found in the adjacent territory.

Fl.—Mid-August to early September.

Middle District.—Griffith's Swamp, Lindenwold (S).

Pine Barrens.—Toms River, Forked River, Waretown, Manahawkin, Coxe's, West Creek (S), Pasadena, Speedwell (S), Batsto (S) opp. Crowleytown, Taunton (S), Atco, Cedar Brook, Ancora (P), Hammonton, Eighth St., Landisville, Egg Harbor City (S).

CINNA L.

Cinna arundinacea L. Wood Reed Grass.

Pl. XII., Fig. 4.

Cinna arundinacea Linnæus, Sp. Pl. 5. 1753 [Canada].—Barton Fl. Phila. I. 44. 1818.—Knieskern 37.—Britton 289.

Shady ground; common in the northern counties and less frequent throughout the Middle district. Common also along the coastal strip and on both sides of the Cape May peninsula.

The coast plant always develops a very heavy inflorescence. Plants of the other extreme probably accounted for the "*C. pendula*" credited to South Jersey in Willis' Catalogue, but which has very properly, I think, been omitted from subsequent catalogues, as there are no specimens extant and the plant is a typical mountain species.

Fl.—Late July to early September.

Middle District.—New Egypt, Delair, Fish House, Hartford, Lawnside (S), Gloucester (P), Mickleton (H), Swedesboro.

Coast Strip.—Pt. Pleasant (P), Ocean City (S), Palermo (S), Mays Landing (S), Five-Mile Beach, Piermont (S).

Cape May.—Goshen (S), Cape May (OHB).

AGROSTIS L.

Key to the Species.

- a. Spikelets consisting of two glumes and two flower-scales, the shorter one at least one-third as long as the other.
- b. Panicle large and open.

- c. Larger flower scale with a short awn. *A. alba aristata*, p. 225
 cc. Larger flower-scale not awned. [*A. alba*]*
 bb. Panicle contracted, dense and spike-like, usually about 2 in. long.
A. maritima, p. 225
 aa. One flower-scale wanting, or exceedingly minute.
 b. Spikelets 1.5-2 mm. long.
 c. Culms weak and often prostrate, panicle green, branches dividing at or below the middle, spikelets scattered. *A. perennans*, p. 226
 cc. Culms erect, panicle silvery or purplish, exceedingly capillary and diffuse, branches dividing above the middle, spikelets crowded toward the tips. *A. hyemalis*, p. 226
 bb. Spikelets 2-3 mm. long, culms erect.
 c. Branches of the panicle dividing above the middle, spikelets crowded at the ends, panicle purplish. *A. elata*, p. 225
 cc. Branches of the panicle dividing below the middle, panicle greenish or slightly purple. *A. pseudointermedia*, p. 226

***Agrostis alba aristata* Gray. Awned Herd Grass.**

Agrostis alba aristata Gray, Man. Ed. I. 578. 1848 [E. North America].—Hitchcock, Bureau Pl. Indst. U. S. Dept. Agr. 68: 27. 1905.

This awned form of *A. alba* was collected by Mr. Charles S. Pollard at Wildwood, N. J., July 4, 1897, and reported by Hitchcock in 1905. It doubtless occurs elsewhere, and is probably native along the coast.

***Agrostis maritima* Lam. Coast Bent Grass.**

Agrostis maritima Lamareck, Encycl. I. 61. 1783 [Narbonne, France].
Agrostis alba maritima Hitchcock, Bull. Bur. Pl. Ind., U. S. Dept. Agr. 68:27. 1905.

Damp spots along the coast, especially among the sand dunes. Also at one station in the Pines along the Egg Harbor river (coast intrusion?).

Fl.—Early June into July.

Coast Strip.—Spray Beach (L), Surf City (L), Peahala (L), Palermo, Wildwood, Anglesea, Bennett, Cape May.

Pine Barrens.—Folsom.

***Agrostis elata* Pursh. Tall Bent Grass.**

Agrostis elatum Pursh, Fl. Am. Sept. I. 61. 1814 [Sandy deep swamps, N. J.].—Willis 72.

Trichodium elatum Torrey, Fl. U. S. I. 83. 1824.

Agrostis altissima Britton 288.—Keller and Brown 44.

Agrostis perennans elata Hitchcock, Bull. Pl. Indust., U. S. Dept. Agr. 68:27. 1905.

* Red-top, or Herd-grass, abundantly introduced. Pl. XII., Fig. 3.

Swamps of the Pine Barrens frequent. Rare and local in the Cape May peninsula.

Fl.—Mid-August into October.

Pine Barrens.—Forked River, Pasadena, West Creek (S), Speedwell (S), Atsion, Batsto, Hammonton (C), Atco (C), Landisville, Kenilworth (S), Clementon (S), Egg Harbor City (P).

Cape May.—Cold Spring (OHB).

***Agrostis pseudointermedia* Farwell. Upland Bent Grass.**

Agrostis pseudointermedia Farwell, Ann. Rep. Com. Parks and Boul'vds, Detroit, Mich. II. 46. 1900 [N.n for *A. intermedia*, Sm. nec. Balb. 1802, Pine Mt., Tenn.]

This is apparently the commoner form throughout the Middle and Cape May districts, the more delicate *A. perennans* being more northern.

Fl.—Early August into October.

Middle District.—Swedesboro, Millville.

Coast Strip.—Pasadena.

Cape May.—Greenfield.

***Agrostis perennans* (Walt.). Thin Grass.**

Cornucopia perennans Walter, Fl. Car. 74. 1788 [South Carolina].—Britton 288.

Throughout the northern counties in moist ground. Rare in the upper part of the Middle district.

Fl.—Early August into October.

Middle District.—Prospecttown, Medford (S), Tomlin.

***Agrostis hyemalis* (Walt.). Rough Hair Grass.**

Cornucopia hyemalis Walter, Fl. Car. 73. 1788 [South Carolina].

Agrostis scabra Knieskern 37.

Agrostis hyemalis Britton 288.

Common in dry ground throughout the State.

Fl.—Early June into August.

Middle District.—Camden, Washington Park, Tomlinson's, Sicklerville, Swedesboro.

Pine Barrens.—Toms River (S), Speedwell (S), Bear Swamp (S), Ballinger's Mill (S), Berlin (S), Williamstown Jnc., Belleplain (S), Millville (S).

Coast Strip.—Surf City (L).

Cape May.—Whitesboro (S), Cold Spring (S).

CALAMAGROSTIS Adanson.

Key to the Species.

- a. Panicle contracted and spike-like, green tinged with purple. *C. cinnoides*, p. 227
- aa. Panicle open spreading purplish. *C. canadensis*, p. 227

Calamagrostis canadensis (Michx.). Blue Joint Grass.

- Arundo canadensis* Michaux. Fl. Bor. Am. I. 73. 1803 [Canada].—Knieskern 37, 1857.
- Arundo agrostoides* Pursh, Fl. Am. Sept. I. 86. 1814 [Bogs of New Jersey and Penna.].
- Calamagrostis canadensis* Willis, 73.—Keller and Brown 44.
- Deyeuxia canadensis* Britton 289.

Frequent in swamps of the northern counties, extending south locally through the Middle district to Cape May.

Fl.—Early June to early July.

Middle District.—Squan (S), Shark River (C), Farmingdale, Hartford, Mickleton (NB), Gibbstown (H), Repaupo (NY), Egg Harbor City (KB).

Cape May.—Bennett (S), Cape May (OHB).

Coast Strip.—Beach Haven (L) (introduced?)

Calamagrostis cinnoides (Muhl.). Nuttall's Reed Grass.

Pl. X., Fig. 1.

- Arundo cinnoides* Muhlenberg Gram. 187. 1817 [Pennsylvania and Massachusetts].—Barton Fl. Phila. I. 70.
- Calamagrostis Nuttalliana* Willis 13.
- Arundo coarctata* Torrey, Fl. U. S. I. 94. 1824.
- Deyeuxia Nuttalliana* Britton, 289.
- Calamagrostis cinnoides* Keller and Brown 44.
- Calamagrostis coarctata* Knieskern 37.

Occasional in the northern counties, and frequent in swamps of the Middle district and plentiful in the Pine Barrens and Cape May peninsula. Rare on the coast.

Fl.—Late July to mid-September.

Middle District.—Shark River (NB), New Egypt, Griffith's Swamp, Camden (P), Mickleton, Dividing Creek.

Pine Barrens.—Forked River, Waretown, West Creek (S), Manahawkin, Coxe's, Speedwell (S), Taunton (S), Landisville, Hammonton, Atsion (S), Quaker Bridge (P), Egg Harbor City, Woodbine, Petersburg (S), Ocean City Jnc.

Coast Strip.—Surf City (L).

Cape May.—Court House (S), Bennett, Cape May (OHB).

AMMOPHILA Host.

Ammophila arenaria (L.). Sea Sand Reed.

Pl. V., Fig. 2.

Arundo arenaria Linnæus, Sp. Pl. 82. 1753 [Europe].—Muhlenberg Gram. 181. 1817.*Phalaris maritima* Nuttall, Gen. I. 48. 1818.*Calamagrostis arenaria* Knieskern, 38.—Willis 73.*Ammophila arenaria* Britton, 289.—Keller and Brown 43.

Abundant on the sand dunes of the entire coast. The Beach Grass is one of the most characteristic plants of the coastal islands. Its pale glaucous green leaves and whitish spike give to these bare mounds their first verdure, while the long roots, which ramify in all directions, play an important part in binding the sand together and holding it against the wind which is always drifting it this way and that. The stiff stalks and leaves adapted as they are for this constant battle with the elements, persist through the winter, dried and bleached to a pale buff, and bend and flutter in the fierce storms as gaily as in the milder blasts of summer, ever holding the beach line against the encroachment of wind and wave.

Fl.—Mid-August to mid-September, the dried panicles persisting into winter.

Maritime.—Sandy Hook, Deal, Pt. Pleasant, Waretown, Seaside Park (Ha), Barnegat Pier, Spray Beach (L), Atlantic City, Longport (S), Ocean City (S), Sea Isle City (S), Stone Harbor (S), Wildwood, Cape May.

CALAMOVILFA Hackel.

Calamovilfa brevipilis (Torr.). Pine Barren Reed Grass.

Pl. XIII., Fig. 1.

Arundo brevipilis Torrey, Fl. U. S. I. 95 [Quaker Bridge, N. J.].*Calamagrostis brevipilis* Knieskern, 38.—Willis 73.*Ammophila brevipilis* Britton, 290.*Calamovilfa brevipilis* Keller and Brown 45.

Common in Pine Barren bogs; does not range north of this district.

This is one of the characteristic grasses of the Pine Barrens. In general appearance it strikingly recalls *Tridens flavus*.

Fl.—Early July to late August, or rarely a little later.

Pine Barrens.—Toms River, Prospertown, Forked River (S), Atco (P), Speedwell (S), Chatsworth, Buena Vista, Parkdale (S), Hammonton, Quaker Bridge, Egg Harbor City.

One specimen in the Academy herbarium is marked "Atlantic City, C. A. Boice." It seems probable, however, that it came from the mainland west of Atlantic City, and not from the island beach, as we have no definite evidence of its occurrence on the coast, and it would seem very unlikely.

DESCHAMPSIA Beauvois.

Deschampsia flexuosa (L.). Wavy Hair Grass.*

Pl. VII., Fig. 1.

Aira flexuosa Linnæus, Sp. Pl. 65. 1753 [Europe].—Barton Fl. Phil. I. 57. 1818.—Knieskern 39.—Britton 290.

Frequent in dry ground in the northern, Middle and Cape May districts, but apparently rare and recently introduced in the Pine Barrens.

Fl.—Late May to late June.

Middle District.—Red Bank, Farmingdale, New Egypt, Crosswicks, Kinokora, Mt. Holly, Arneys Mt. (S), Fish House (S), Medford (S), Westville, National Park, Washington Park, Woodbury, Mickleton (NB), Swedesboro, Centerton (S), Millville.

Pine Barrens.—Forked River, New Germany, Folsom.

Cape May.—Anglesea Jnc. (OHB), Bennett (S), Cape May, Cape May Pt. (S).

SPHENOPHOLIS.

Key to the Species.

- a. Spikelets with a conspicuous bent awn. *S. palustris*, p. 230
- aa. Spikelets not awned.
 - b. Culm erect, densely flowered and spike-like.
 - c. Sheaths and leaves glabrous. *S. obtusata*, p. 230
 - cc. Sheaths and sometimes leaves pubescent. *S. o. pubescens*, p. 230
 - bb. Culm slender, inflorescence lax, loosely flowered.
 - c. Glumes nearly the same length, one narrow, one broad. *S. nitida*, p. 230
 - cc. Narrow glume much shorter than the obovate one. *S. pallens*, p. 230

* *Deschampsia cæspitosa* Linnæus.

(*Aira cæspitosa* Linnæus, Sp. Pl. 64. 1753 [Europe]).

The only evidence of the occurrence of this grass within our limits is Dr. Knieskern's statement that it occurs in "damp places" in Ocean and Monmouth Counties "rare." I have seen no specimens. To the north it has been found along the Delaware above the Water Gap.

Sphenopholis obtusata (Michx.). Blunt-scaled Eatonia.

Aira-obtusata Michaux, Fl. Bor. Am. I. 62. 1803 [Carolina and Florida].

Eatonia obtusata Britton 293.—Keller and Brown 50.

Several stations in the northern counties and southward along the Coastal strip to Cape May.

Fl.—Early June into July.

Middle District.—Farmingdale.

Coast Strip.—Beach Haven (L), Spray Beach (L), Stone Harbor, Cape May (OHB).

Sphenopholis obtusata pubescens Scribner and Merrill.

Sphenopholis obtusata pubescens Scribner and Merrill, Circ. U. S. Dept. Agr. 27, p. 6. 1900 [Stackville, Miss.].

Along the Coast strip apparently as frequent as the last.

Fl.—Early June into July.

Coast Strip.—Surf City (L), Spray Beach (L), Sherburn's (L).

Sphenopholis nitida Spreng. Slender Eatonia.

Aira nitida Sprengel, Fl. Hal. Mant. I. 32. 1807 [Pennsylvania].

Eatonia Dudleyi Britton 293.

Eatonia nitida Keller and Brown 50.

One record for Hunterdon County, locally in the Middle district. Sandy ground.

Fl.—Early May to mid-June.

Middle District.—Mickleton, Swedesboro, Tomlin, Riddleton, Auburn.

Sphenopholis pallens (Spreng.). Pale Eatonia.

Pl. XIV., Fig. 5.

Aira pallens Sprengel, Fl. Hal. Mant. I., p. 33. 1807 [Pennsylvania].

Eatonia Pennsylvanica Britton 293.

Shady ground; common in the northern counties, ranging southward in the Middle district.

Fl.—Late May to early July.

Middle District.—Farmingdale, New Egypt, Delair, Camden (Bassett), Medford (S), Washington Park, Sewell (S), Mickleton (NY) Swedesboro, Millville (S), Buckshutem.

Sphenopholis palustris (Michx.). Marsh Eatonia.

Avena palustris Michaux, Fl. Bor. Am. I. 72. 1803 [Georgia and Carolina].

—Barton Fl. Phila. I. 69. 1818.

Trisetum pennsylvanicum Britton 290.—Keller and Brown 45.

Moist open ground in the northern counties, southward locally in the Middle and Cape May districts.

Mr. Long refers the Farmingdale specimen to var. *flexuosa* Scribn.

Fl.—Late May to late June.

Middle District.—Farmingdale, Clementon, Medford (S), Lindenwold (S), Mickleton, Pitman, Swedesboro.

Cape May.—Cold Spring.

DANTHONIA De Candolle.

Key to the Species.

a. Awned flower scale, notched at the end with triangular pointed tips.

D. spicata, p. 231

aa. Awned flower scale with tips prolonged into slender bristles.

b. Awned scale, silky hairy.

D. sericea, p. 231

bb. Awned scale, glabrous.

D. epilis, p. 232

Danthonia spicata (L.)* Wild Oat Grass.

Pl. VIII., Fig. 5.

Avena spicata Linnæus, Sp. Pl. 80. 1753 [Pennsylvania].

Danthonia spicata Knieskern 39.—Britton 291.

Dry sandy ground; common except in the Pine Barrens.

Fl.—Late May to late June.

Middle District.—Farmingdale (S), New Egypt, Asbury, Medford (S), Albion, Glassboro (S), Swedesboro, Riddleton, Husted (S), Centerton (S).

Pine Barrens.—Winslow, Speedwell (S).

Coast Strip.—West Creek (S), Peermont (S).

Cape May.—Cape May (OHB).

Danthonia sericea Nutt. Silky Wild Oat Grass.

Danthonia sericea Nuttall, Gen. I. 71. 1818 [Carolina to Florida].—Barton, Fl. Phila. I. 65. 1818.—Willis 75.—Gray Manual Ed. V. 640. 1867.—Britton 291.

Danthonia glumosa Knieskern 39.

Frequent in the Pine Barrens in dry sandy soil, and locally in the lower part of the Middle district.

Fl.—Late May to late June.

Middle District.—Spring Garden (NB), Lindenwold, Gibbsboro, Tomlinsons, Williamstown (KB), Sicklerville (S).

* Specimens from within our limits referred to *D. compressa* and all referable to *D. spicata*, so far as I have been able to examine them.

Pine Barrens.—Manchester (C), Browns Mills, Speedwell (S), Albion, Cedar Brook, Waterford (P), White Horse (P), Landisville, Winslow Jnc., Hammonton, Atsion (P), Quaker Bridge, Batsto, Folsom, Egg Harbor City (P), Mays Landing, Dennisville (P).

Coast Strip.—Ocean Beach (C).

Danthonia epilis Scribn. Smooth Wild Oat Grass.

Danthonia epilis Scribner, U. S. Div. Agrost. Circ. 30, p. 7 [n. n. for *D. glabra* Nash nec Philippi—Little Stone Mt., Ga.].

Restricted to the Pine Barren region, which marks the northern limit of the species.

Abundant on natural bogs, growing in the wet sphagnum entirely different in habitat from the preceding, and very distinct.

Fl.—Probably late May to late June.

Pine Barrens.—Forked River, Three mi. S. E. of Chatsworth, Three mi. N. of Atsion.

SPARTINA Schreber.

Key to the Species.

- a. Glumes unequal, shorter one equal to flower scales. *S. michauxiana*, p. 232
- aa. Glumes unequal, shorter one-half as long as flower scales.
- b. Both glumes scabrous on the keel.
- c. Leaves 12 mm. wide or more. *S. cynosuroides*, p. 233
- cc. Leaves not over 6 mm. wide. *S. patens*, p. 233
- bb. Shorter glume glabrous.
- c. Spikelets overlapping. *S. glabra pilosa*, p. 234
- cc. Spikelets more remote, barely overlapping. *S. g. alternifolia*, p. 234

Spartina michauxiana Hitchc. Tall Marsh Grass.

Spartina michauxiana Hitchcock, Contr. Nat. Herb. XII. 3. 153 [new name for *Trachynotia cynosuroides* Michx. nec *Dactylis cynosuroides* L. [Illinois].

Spartina cynosuroides Britton 283.—Keller and Brown 47.

Larger rivers along the coast, extending inland to Hammonton. Casual also in Bergen and Hunterdon Counties.

Fl.—Mid-July into September. Panicles persist through autumn.

Coast Strip.—Pt. Pleasant (S), Seaside Park (S), Toms River (S), Barnegat Pier, Forked River, Manahawkin, Barnegat, Tucker's (L), West Creek, Absecon, Longport (Ha), Ocean City (S), N. of Weekstown, Hammonton, Town Bank (OHB).

***Spartina cynosuroides* (L.). Salt Reed Grass.**

Pl. XV., Fig. 1.

Dactylus cynosuroides Linnæus, Sp. Pl. 71. 1753 [Virginia, Canada and Louisiana].

Spartina polystachya Knieskern 38.—Willis 73.—Britton 283.—Keller and Brown 47.

Common on the edges of salt marshes and along brackish creeks; not extending inland, as does the preceding.

Fl.—Early August into September. Panicles persist through autumn.

Maritime.—Forked River, Seaside Park, Manahawkin, Surf City (L), Barnegat City (L), Barnegat City Inc. (L), Absecon, Atlantic City, Palermo, Cedar Bonnet (L), Dennisville, Cape May (OHB), Sluice Creek, Upper English Creek (T), Salem.

***Spartina patens* Ait. Salt Meadow Grass.**

Plate XV., Fig. 5.

Dactylis patens Aiton, Hort. Kew. I. 104. 1789 [North America].

Spartina juncea Muhlenberg Cat. 8. 1813.—Muhlenberg Gram. 54. 1817.—Knieskern 38.—Willis 73.—Britton 283.

Spartina patens Keller and Brown 47.

Abundant all over the salt meadows.

This grass, along with *Distichlis spicata* and *Juncus gerardi* forms the bulk of the low even vegetation that covers the firmer parts of the salt meadows, the mass of tangled roots of the three species being mainly responsible for holding together the black mud and sand which form the meadows.

Dondia, *Salicornia*, and other salt marsh plants occur in more sandy spots, and along the creeks is a taller growth of *Spartina glabra*, but the green carpet which covers miles upon miles of our coastal marshes consists mainly of the three species above mentioned, and the "salt hay" that the farmers along the shore are in the habit of gathering is composed of the same plants.

Hay-making in the autumn is a common sight on the "meadows," and once or twice I have seen the crop being hauled in in mid-winter.

The more robust form regarded as a species, *S. juncea* by Merrill (Bull. Pl. Indust. U. S. Dept. Agr. IX 12, 1902), originally described as *Trachynotia juncea* by Michaux (Fl.

Bor. Am. I 64, 1803—Carolina and Georgia) apparently occurs in sandy localities near the marshes. but I cannot satisfactorily separate it from the typical form.

Fl.—Early July to late September.

Maritime.—Sandy Hook, Deal, Pt. Pleasant, Barnegat Pier, Surf City (L), Barnegat City (L), Beach Haven (L), St. Albans (L) Harvey Cedars (L), Spray Beach (L), Atlantic City, Ocean City, Palermo (S), Estelville, Stone Harbor, Anglesea, Cape May, Salem, Beaver Dam, Dias Creek (S), Cold Spring (S).

***Spartina glabra pilosa* Merrill. Smooth Marsh Grass.**

Spartina glabra pilosa Merrill, Bull. Pl. Indust. U. S. Dept. Agr. IX., p. 9. 1902 [Atlantic City, N. J.]

Spartina glabra Knieskern 38.

Spartina stricta var. *glabra* Britton 283.

Spartina stricta Keller and Brown 47.

Common along creeks and ditches on the salt marshes of the coast and Delaware Bay.

Fl.—Late July to mid-September.

Maritime.—Deal Beach, Pt. Pleasant, Forked River, Beach Haven (L), St. Albans (L), Half Way House south of Bond's (L), Marsh Elder Isl. (L), Anchoring Isl. (L), Ocean City (S), Palermo, Stone Harbor (S), Wildwood, Holly Beach (T), Cold Spring (S), Dennis (S), Salem (P).

***Spartina glabra alterniflora* (Lois.).**

Spartina alterniflora Lois, Fl. Gall. II. 719. [Circa Baionam at Ripas Aturi].

Spartina stricta var. *maritima* Britton 283.

Spartina stricta alterniflora Keller and Brown 47.

Spartina glabra alterniflora Merrill, Bull. Pl. Indust. U. S. Dept. Agri. IX., p. 12, 1902.

Similar situations to those occupied by the last, but less abundant.

Maritime.—Seaside Park, Atlantic City, Cape May (S), Salem (S).

GYMNOPOGON Beauvois.

Key to the Species.

- | | |
|--|--------------------------------|
| a. Spikes bearing spikelets for their whole length. | <i>G. ambiguus</i> , p. 234 |
| aa. Spikes bearing spikelets only beyond the middle. | <i>G. brevifolius</i> , p. 235 |

***Gymnopogon ambiguus* (Michx.). Broad-leaved Gymnopogon.**

Pl. IX., Fig. 6.

Andropogon ambiguus Michaux, Fl. Bor. Am. I. 58. 1803 [Carolina].—Muhlenberg, Cat. 94. 1813.—Muhlenberg Gram. 285. 1817.

Anthropogon lepturoides Barton, Fl. Phila. I. 71. 1818.

Gymnopogon racemosus Willis 73.—Torrey Flora U. S. I. 99. 1824.

Gymnopogon ambiguus Britton 292.—Keller and Brown 47.

Locally through the lower part of the Middle district and in the Cape May peninsula, in dry ground. Also at one or two points in the Pine Barrens, where it has probably entered along the rail-roads. New Egypt seems to be the northern limit of its range, as it is not known north of our region.

Fl.—Early August to mid-September.

Middle District.—New Egypt, Griffith's (P), Springdale (S), Lindenwold (S), Clarksboro (NB), Mickleton, Tomlin (S), Clementon, Berlin (S), Albion, Swedesboro.

Pine Barrens.—Hammononton.

Cape May.—Court House (S), Anglesea Inc., Whitesboro (S).

***Gymnopogon brevifolius* Trin. Short-leaved *Gymnopogon*.**

Gymnopogon brevifolius Trinius, Unifl. 238. 1824 [Delaware].—Britton Manual 122. 1901.—Stone Torrey 1907, 39.—Keller and Brown 47.

Dry ground in the Middle and Cape May districts. Rare. Known from only two localities. Originally discovered in the State by Mr. Chas. D. Lippincott, near Swedesboro.

Trinius quotes this species as "*Anthropogon brevifolius* Nuttall," and probably the name should be so credited. So far as I am aware, Nuttall never published it, but very likely sent out specimens with this name in manuscript.

Fl.—Late August to mid-October.

Middle District.—Two and a half miles north of Swedesboro.

Cape May.—Cold Spring, Bennett.

PHRAGMITES Trinius.

***Phragmites phragmites* (L.). Reed.**

Pl. XI., Fig. 2.

Arundo phragmites Linnæus, Sp. Pl. 81. 1753 [Europe].

Phragmites communis Kneskern 39.—Willis 75.

Phragmites vulgaris Britton 293.

Phragmites phragmites Keller and Brown 48.

Open swamps usually growing in water, locally throughout the State except in the Pine Barrens.

The Reed is most plentiful in our region along the coast in swamps lying back of the salt marshes. It often covers large areas, looking at a distance like growing corn.

Fl.—Mid-August into September.

Middle District.—Kaighns Pt., Beaver Dam, Pen Bryn (S) [Introduced?].

Coast Strip.—Sandy Hook, Avon, Pt. Pleasant, Bay Head (N. Y.), Seaside Park, Barnegat City (L), N. Beach Haven (L), Peahala (L), Sea Isle City (H), Holly Beach (UP), Court House, Cold Spring (OHB), Cape May (S), South Dennis (S), Sluice Creek (S).

TRIDENS Roemer and Schultz.

Tridens flavus (L.). Tall Red-top.

Pl. XIII., Fig. 3.

Poa flava Linnæus, Sp. Pl. 68. 1753 [Virginia].

Tricuspis seslerioides Knieskern 38.—Torrey, Fl. U. S. I. 118. 1824.

Triodia seslerioides Britton 292.

Plentiful in dry soil in the Northern, Middle and Cape May districts and all along the coastal strip, but not found in the Pine Barrens, except where it follows up the tide water creeks.

Fl.—Early August to early September.

Middle District.—New Egypt, Medford (S), Oaklyn (S), Albion, W. Deptford, Swedesboro, Beaver Dam.

Coast Strip.—Forked River, Beach Haven (L), Pleasant Mills, Atlantic City, Sea Isle City (S), Five-Mile Beach.

Cape May.—Three miles west of Court House (S), S. Dennis (S), Cape May (OHB).

TRIPLASIS Beauvois.

Triplasis purpurea (Walt.). Sand Grass.

Pl. VIII., Fig. 3.

Aira purpurea Walter, Fl. Car. 78. 1788 [South Carolina].

Tricuspis purpurea Knieskern 38.—Willis 73.

Triplasis purpurea Britton 292.—Keller and Brown 48.

Sandy ground or pure sand common along the coast strip and in the lower part of the Middle district, and less abundant in the Pine Barrens.

Fl.—Early August to late September.

Middle District.—Griffith's Swamp, Kaighns Pt., Washington Park (S), Lindenwold (S), Lawnside (S), Westville, Woodbury, Mantua.

Pine Barrens.—Browns Mills, Clementon, Albion, Atsion (S), Pleasant Mills (S).

Coast Strip.—Manahawkin, Barnegat City (L), St. Albans (L), Sherburn's (L), Atlantic City, Ocean City (S), Piermont, Cape May (OHB).

DIPLACHNE Beauvois.

Diplachne fascicularis (Lam.). Salt Meadow Diplachne.*Poa fasciculata* Torrey, Fl. U. S. I. 107 [N. Y. City] 1824.*Leptochloa fascicularis* Willis 73.*Diplachne fascicularis* Britton 292.—Kellar and Brown 48.

Edges of the salt meadows along the coast. Not abundant.

Fl.—Mid-August to mid-October.

Maritime.—Barnegat City (L), Beach Haven Terrace (L), Atlantic City (P), Sea Isle City, Wildwood, Cape May.

ERAGROSTIS Beauvois.

Key to the Species.

- a. Culms creeping. *E. hypnoides*, p. 238
- aa. Culms not creeping.
 - b. Much branched and decumbent at base, spikelets dull purplish or lead colored.
 - c. Spikelets 2-5 flowered, not over 3 mm. long. *E. capillaris*, p. 237
 - cc. Spikelets 5 to many flowered, 3-15 mm. long.
 - d. Spikelets 1.5 mm. wide. *E. pilosa*, p. 237
 - dd. Spikelets 2 mm. [*E. major*]*
 - bb. Simple and erect, rigid spikelets, bright redish purple.
 - c. Sheaths sparingly pilose. *E. pectinacea*, p. 238
 - cc. Sheaths glabrous. *E. p. spectabilis*, p. 238

Eragrostis capillaris (L.). Hair-like Eragrostis.*Poa capillaris* Linnæus, Sp. Pl. 68. 1753 [Virginia and Canada].*Poa hirsuta* Pursh, Fl. Am. Sept. I. 80. 1814.*Eragrostis capillaris* Knieskern 38.—Britton 294.—Keller and Brown 49.

Dry ground, local; known from four localities in the northern counties and three in the Middle district.

Fl.—Mid-August to early October.

Middle District.—Camden, Birmingham, Swedesboro.*Eragrostis pilosa* (L.). Tufted Eragrostis.

Pl. XIII., Fig. 2.

Poa pilosa Linnæus, Sp. Pl. 68. 1753 [Italy].*Poa tenella* Pursh, Fl. Am. Sept. I. 80. 1814.*Eragrostis pilosa* Knieskern, 38.—Britton 293.—Keller and Brown, 49.*Eragrostis Purshii* Britton 294.—Keller and Brown 49.

* Strong-scented Eragrostis, a weed in waste ground.

Common throughout the Middle and coast districts, and occasional in the northern counties and Pine Barrens. In part, at least, introduced.

Fl.—Late June to late September.

Middle District.—New Egypt, Delaire (S), Kaighns Pt., Mullica Hill (NB), Swedesboro.

Pine Barrens.—Lakehurst.

Coast Strip.—Pt. Pleasant, Surf City (L), Barnegat City (L), Beach Haven (L), Wildwood (KB), Dias Creek (S).

***Eragrostis pectinacea* (Michx.). Purple *Eragrostis*.**

Pl. IX., Fig. 5.

Poa pectinacea Michaux, Fl. Bor. Am. I. 69. 1803 [Illinois].—Pursh. Fl. Am. Sept. I. 81. 1814.

Eragrostis pectinacea Britton 294.

Dry ground throughout the State, except the Pine Barrens, where it occurs only along railroads. This is one of those grasses that seems to thrive in cultivated ground and tends to become a weed.

Fl.—Late July to mid-September.

Middle District.—New Egypt, Birmingham, Kaighns Pt., Albion, Mickleton, Swedesboro, Dividing Creek.

Pine Barrens.—Bamber, Landisville.

Coast Strip.—Seaside Park, Manahawkin, Atlantic City (S), Ocean City (S), Sea Isle City (S), Cape May (OHB).

***Eragrostis pectinacea spectabilis* Gray. Coast *Eragrostis*.**

Eragrostis spectabilis Gray Man. Ed. I. 598. 1848 [Mass. to Penna. near the coast].

Along the sand dunes of the coast, frequent.

Fl.—Early August to late September.

Maritime.—Waretown, Surf City (L), N. Beach Haven (L), Sherburn's (L), Atlantic City (S), Ocean City (S), Sea Isle City (S).

***Eragrostis hypnoides* (Lam.). Creeping *Eragrostis*.**

Poa hypnoides Lamarck, Tabl. Encycl. I. 185. 1791 [South America].—

Eragrostis hypnoides Britton 293.—Keller and Brown 49.

Found only along the shores of the Delaware or its vicinity from Warren to Salem Counties; local.

Fl.—Late July into October.

Middle District.—Kaighns Pt. (KB), Petty's Isl. (P), Swedesboro, Riddleton.

UNIOLA L.

Uniola laxa (L.). Slender Spike Grass.

Pl. XIV., Fig. 6.

Holcus laxus Linnæus, Sp. Pl. 1048. 1753 [Virginia and Canada].

Uniola gracilis Muhlenberg, Gram. 157. 1817.—Barton Fl. Phila. II. 220.

1818.—Torrey Fl. N. Y. 19. 1819—Knieskern 39.—Willis 75.

Uniola laxa Britton 294.—Keller and Brown 50.

Common throughout the Middle and Cape May districts and on the Coastal strip, also at South Amboy to the northward. Absent from the Pine Barrens.

Fl.—Early August to early September.

Middle District.—Keyport (NB), New Egypt, Westmont (S), Griffith's Swamp, Medford (S), Washington Park (S), Lawnside (S), Lindenwold, Mickleton (NB), Tomlin, Clementon (S), Swedesboro, Salem (S), Dividing Creek.

Coast Strip.—Long Branch, Pt. Pleasant (S), Bay Head (NY), Manahawkin, Coxe's, Beesley's Pt. (S), Five-Mile Beach, Sea Isle Jnc. (S).

Cape May.—Court House, Bennett (S).

DISTICHLIS Rafinesque.

Distichlis spicata (L.). Marsh Spike Grass.

Pl. VIII., Fig. 2.

Uniola spicata Linnæus, Sp. Pl. 71. 1753 [North America].

Brizopyrum spicatum Knieskern 38.—Willis 74.

Distichlis spicata Britton 284.—Keller and Brown 50.

Salt meadows along the coast; common.

Fl.—Mid-August into September.

Maritime.—Sandy Hook (NB), Deal Beach, Pt. Pleasant, Waretown, Barnegat City (L), Beach Haven Terrace (L), Barnegat City Jnc. (L), Beach Haven (L), Cedar Bonnet (L), Atlantic City, Ocean City (S), Sea Isle City, Wildwood, Piermont, Cape May (S), Dennisville (S).

POA L.

Key to the Species.

a. Culms tufted.

b. Low, not more than 2 dm. high.

[*P. annua*]*

bb. Taller, 3-9 dm. high.

*Low Spear Grass. Common in lawns and waste ground.

- c. Basal leaves nearly equalling panicle, upper stem leaves very short, spikelets 5-7 mm. long. *P. brachyphylla*, p. 240
- cc. Basal leaves much shorter than panicle.
- d. Spikelets 3 mm. long, culm scabrous below panicle. [*P. trivialis*]†
- dd. Spikelets 4-5 mm. long, culm smooth. [*P. pratensis*]‡
- aa. Culms not tufted, bluish green, panicle contracted. [*P. compressa*]§

***Poa brachyphylla* Schultes. Short-leaved Spear Grass.**

Poa brachyphylla Schultes, Mant. II: 304. 1824. n. n. for *P. brevifolia* Muhl. nec Gaud. [Pennsylvania].

This species was only known from Warren and Hunterdon Counties until discovered by Mr. O. H. Brown at Cape May, though I am inclined to think that the *P. alsodes* of Dr. Knieskern's catalogue, which he says occurs on the "borders of woods, not common," belongs here. It was later found in west Jersey by Mr. Long.

Fl.—Mid-April to early May.

Middle District.—Bordentown.

Cape May.—Cape May.

PANICULARIA Fabricius.

Key to the Species.

- a. Spikelets not over 7 mm. long.
- b. Panicle dense, club-shaped, spike-like, 75-100 mm. long. *P. obtusa*, p. 241
- bb. Panicle open, spreading.
- c. Spikelets 3-4 mm. wide, becoming whitish or straw color.
- d. Spikelets larger, 5-10 flowered. *P. canadensis*, p. 241
- dd. Spikelets smaller, 3-5 flowered. *P. laxa*, p. 241
- cc. Spikelets less than 2.5 mm. wide.
- d. 3-4 mm. long, purplish, branches of panicle drooping. *P. nervata*, p. 241
- dd. 4-6 mm. long, green, branches of panicle erect. *P. grandis*, p. 243
- ddd. 6-7 mm. long, pale green or whitish. *P. pallida*, p. 242
- aa. Spikelets 12 mm. long or more.
- b. Flowers obtuse. *P. septentrionalis*, p. 242
- bb. Flowers acute. *P. acutiflora*, p. 242

† Rough Meadow Grass. Introduced in meadows and waste ground.

‡ Blue Grass. Cultivated for hay and abundantly naturalized. Pl. VII., Fig. 2.

§ Wire Grass. Common in waste ground, fields, etc.

Panicularia canadensis (Michx.)^{*} Rattlesnake Grass.

Pl. XV., Fig. 3.

Briza Canadensis Michaux, Fl. Bor. Am. I. 71. 1803 [Canada].—Barton, Fl. Phila., I. 63. 1818.

Glyceria canadensis Knieskern 38.—Britton 295.

Swamps of the Northern and Middle districts, common; rarely in the Pine Barrens.

Fl.—Mid-June to mid-July.

Middle District.—Farmingdale, New Egypt, Riverside, Pemberton (C), Birmingham, Fish House, Haddonfield (S), Griffith's Swamp, Gibbstown (NB), Elm (C), Kirkwood (C), Mickleton, Clementon (S), Albion, Sicklerville (S), Gloucester, Salem (C), Beaver Dam.

Pine Barrens.—Bamber, Landisville, Vineland.

Panicularia obtusa (Muhl.). Blunt Manna Grass.

Pl. XV., Fig. 4.

Poa obtusa Muhlenberg, Gram. 147. 1817 [Pennsylvania, New Jersey and New England].—Barton, Fl. Phila., I. 62. 1818.—Torrey, Fl. U. S. I. 112. 1824.

Glyceria obtusa Knieskern 38.—Britton 295.

Panicularia obtusa Keller and Brown 52.

Swamps and bogs throughout our region and locally in Hudson and Middlesex Counties to the north.

Fl.—Early July to late August and sporadically into October.

Middle District.—Farmingdale (S), Hartford, Birmingham, Delaire, Fish House, Griffith's Swp., Westmont (S), Lindenwold (S), Repaupo, Tomlin (S), Mickleton (NY), Paulsboro, Sicklerville (S), Swedesboro.

Pine Barrens.—Allaire, Lakehurst, Toms River (S), Bear Swamp (S), Hammonton, Parkdale (S), Egg Harbor City, Eighth St. (T).

Cape May.—Green Creek, Cold Spring (OHB).

Panicularia nervata (Willd.) Nerved Manna Grass.

Poa nervata Willdenow, Sp. Pl. I. 389. 1798 [North America].—Barton, Fl. Phila., I. 61. 1818.

Glyceria nervata Knieskern 38.—Britton 296.

^{*}*Panicularia laxa* Scribner (Bull. Torr. Club XXI., 37. 1894.—Mt. Desert, Me.), is reported from Mickleton and Swedesboro. Specimens in the Academy herbarium show smaller spikelets, but I cannot find in this character or in those advanced by Prof. Fernald (*Rhodora* 1910, p. 135) sufficient constancy to make the recognition of this form desirable so far as local material is concerned. At most it can only be regarded as a sub-species. It was collected by Mr. Heritage at Mickleton before it was described by Scribner.

Swamps; common in the Northern and Middle districts; very rare in the Pine Barrens and occasional in the Cape May peninsula.

Fl.—Mid-May to mid-June.

Middle District.—Farmingdale, New Egypt, Delanco, Browns Mills, Medford (S), Washington Park, Mickleton, Sewell (S), Albion, Pitman, Glassboro (S), Swedesboro, Yorktown.

Pine Barrens.—Speedwell.

Cape May.—Cold Spring.

***Panicularia pallida* (Torr.). Pale Manna Grass.**

Windsoria pallida Torrey, Cat. N. Y. Plants 91. 1819 [swamp behind Elgin Garden, N. Y., and Pine Barrens of N. J.].

Glyceria pallida Knieskern 38.—Britton 296.

Poa dentata Torrey, Fl. U. S. I. 107. 1824.

Frequent in shady swamps or streams of the northern Middle and Cape May districts, often growing in the water. Rare in the Pine Barrens.

Fl.—Mid-May to mid-June, and sporadically during July and August.

Middle District.—Delanco, Kaighns Pt., Repaupo, Mickleton, Sicklerville, Glassboro (S), Riddleton, Centerton (S).

Pine Barrens.—Winslow Jnc., Landisville, Richland, Woodbine (S).

Cape May.—Bennett, Nummeytown (S), Cold Spring (OHB).

***Panicularia septentrionalis* (Hitchc.). Floating Manna Grass.**

Pl. IX., Fig. 4.

Glyceria septentrionalis Hitchcock, Rhodora 1906. 211 [Guttenburg, N. J.].

Festuca fluitans Barton, Fl. Phila. I. 66. 1818.

Glyceria fluitans Knieskern 38.—Britton 296.

Swamps, usually growing in water. Frequent, except in the Pine Barrens.

Fl.—Late May to early July, and sporadically through the summer.

Middle District.—Riddleton.

Coast Strip.—Stone Harbor, Anglesea.

Cape May.—Cape May (OHB).

***Panicularia acutiflora* (Torr.). Sharp-scaled Manna Grass.**

Glyceria acutiflora Torrey, Fl. U. S. I. 104 [New York, New Jersey and Massachusetts].—Willis 74.—

Glyceria brevifolia Britton 296.

Panicularia acutiflora Keller and Brown 53.

Locally in swamps of the Northern and Middle districts and coast strip.

Fl.—Early June to mid-July, sporadically into August.

Middle District.—Cooper's Pt., Merchantville (P), Gloucester (P), Mickleton (NB).

Pine Barrens.—Waterford (P).

Coast Strip.—Manahawkin.

Panicularia grandis (Wats.). Reed Meadow Grass.

Glyceria grandis Watson, Gray's Man. Ed. 6. 667. 1890 [New England to Minnesota, etc.].

Glyceria arundinacea Britton 296.

A northern species probably now extinct within our limits, but represented in the State herbarium at New Brunswick by one specimen collected many years ago at Cooper's Bridge, by Mr. E. Diffenbaugh.

Middle District.—Cooper's Bridge (NB). Coll. by E. Diffenbaugh, 1863.

PUCCINELLIA Parlatores.

Puccinellia fasciculata (Torr.). Spreading Meadow Grass.

Poa fasciculata Torrey, Fl. U. S. I. 107. 1824 [Salt marshes about N. Y. City].

Glyceria distans Britton 296.

Puccinellia distans Keller and Brown 53.

Borders of salt marshes on the coast.

Fl.—Late May into September.

Maritime.—Surf City (L), Barnegat City (L), Spray Beach (L), Absecon (NB), Cape May, Fortescue Beach (NB).

FESTUCA L.

Key to the Species.

a. Short, erect grasses, 1-6 dm. high, with involute wiry leaves, and greenish or reddish, usually contracted panicles.

b. Flower scales with an awn of equal length. *F. octoflora*, p. 244

bb. Flower scales, awnless or awn much shorter than the scale.

c. Plant over 3 dm. in height, panicle reddish. *F. rubra*, p. 244

cc. Plant less than 3 dm. in height, panicle green. [*F. ovina*]¹

aa. Taller plants 6-15 dm. high, with flat, green leaves.

b. Branches of panicle short and erect, spikelets 5-10 flowered.

[*F. elatior*]²

bb. Branches of panicle long and drooping, spikelets mostly near the ends, 3-6 flowered. *F. nutans*, p. 244

¹ Sheep Fescue Grass, occasionally established in waste ground.

² Tall Fescue Grass, frequent in fields, etc. Pl. XIV., Fig. 1.

Festuca octoflora Walt. **Slender Fescue Grass.**

Pl. XIV., Fig. 1.

Festuca octoflora Walter, Fl. Car. 81. 1788 [South Carolina].—Britton 296.—Keller and Brown 53.*Festuca tenella* Knieskern 39.

Dry sandy soil, casual in the northern counties, frequent throughout our region.

Fl.—Mid-May to mid-June.

Middle District.—Delanco (S), Medford (S), Mickleton.

Pine Barrens.—E. Plains (S), Tabernacle (S), Cedar Brook, Landisville, Pleasant Mills, Tuckahoe.

Coast Strip.—Beach Haven (L), N. Beach Haven (L), Barnegat City (L).

Festuca rubra L. **Red Fescue Grass.***Festuca rubra* Linnæus, Sp. Pl. 74. 1753 [Europe].

Sandy ground along the coast marshes.

This is one of several plants of wide distribution which occur along the coast, and are often regarded as introductions from Europe. Some of them grow under such conditions as to make them appear certainly native, while in the case of others the evidence is less convincing. It has been thought best to include them all.

Fl.—Late May to mid-June.

Maritime.—Sherburn's (L), Surf City (L), Spray Beach (L), Peahala (L), Beach Haven (L), Barnegat City (L), Holgate's (L), Beach Haven Terrace (L).

Festuca nutans Spreng. **Nodding Fescue Grass.***Festuca nutans* Sprengel, Fl. Hal. Mantissa 34. 1807 [Pennsylvania].—Knieskern 39.—Willis 74.—Britton 297.

Rocky woods of the northern counties and southward in the Middle district.

Fl.—Late May to early June.

Middle District.—Pemberton (C), Medford (S), Mickleton, Swedesboro.

BROMUS L.*Key to the Species.*

a. Plant tall, 2-5 feet high (in woodlands), flowers pubescent, panicle weak and drooping. *B. purgans*, p. 245

aa. Plants lower, rarely over two feet high (waste ground plants).

Bromus purgans L. Wood Chess.

Bromus purgans Linnæus, Sp. Pl. 76. 1753 [Canada].

Bromus ciliatus Knieskern 39.—Britton 297.

Woods of the northern counties, casually entering the upper part of Monmouth Co., according to Knieskern, and discovered by Mr. Benjamin Heritage at Wildwood in the lower coast district.

Coast Strip.—Wildwood (H).

ELYMUS L.*Key to the Species.*

- a. Glumes awl-shaped, spike nodding. *E. striatus*, p. 245
- aa. Glumes lanceolate.
 - b. Glumes indurated below, spikes erect.
 - c. Plant seldom over 6 dm. high, leaves narrow. *E. halophilus*, p. 245
 - cc. Plant 9–12 dm. high, leaves broad. *E. virginicus*, p. 245
 - bb. Glumes not indurated below, spike nodding. *E. canadensis*, p. 246

Elymus striatus Willd. Slender Wild Rye.

Pl. XI., Fig. 4.

Elymus striatus Willdenow, Sp. Pl. I. 470. 1797 [North America].—Knieskern 39.—Britton 299.—Keller and Brown 56.

Northern counties, south locally in the Middle district and along the coastal strip; banks of streams.

Fl.—Late June to late July.

Middle District.—Swedesboro, Westville.

Coast Strip.—Atlantic City, Anglesea, Cape May.

Elymus virginicus L. Virginia Wild Rye.

Pl. XI., Fig. 6.

Elymus virginicus Linnæus, Sp. Pl. 84. 1753 [Virginia].—Knieskern 39.—Beck's Botany 415. 1833.—Britton 298.

Northern and Middle districts, casual along the coast and in the Cape May peninsula; banks of streams.

Fl.—Late July to early September.

Middle District.—New Egypt, Pemberton Inc. (S), Medford (S), Washington Park, Jumbo, Swedesboro.

Coast Strip.—Avon, Anglesea, Court House, Cold Spring.

Elymus halophilus Bicknell. Coast Wild Rye.

Elymus halophilus Bicknell, Torr. Bull. 35. Apr., 1908, p. 201 [Nantucket].

Edge of salt marshes along the coast and on the lower bay shore.

Fl.—Late July to early September.

Maritime.—Sandy Hook (NB), Pt. Pleasant, Manahawkin, Surf City (L), Barnegat City Inc. (L), Beach Haven (L), Harvey Cedars (L), Peahala (L), Ship Bottom (L), Atlantic City (NB), Cape May Ct. House, Dias Creek.

***Elymus canadensis* L. Nodding Wild Rye.**

Elymus canadensis Linnæus, Sp. Pl. 83. 1753 [Canada].—Knieskern 39.—Willis 75.—Britton 298.

River banks, Northern and Middle districts.

Fl.—Early July to early September, or occasionally later.

Middle District.—Shark River (C), Delair, Swedesboro.

HYSTRIX Moench.

***Hystrix hystrix* (L.). Bottle-brush Grass.**

Elymus Hystrix Linnæus, Sp. Pl. Ed. 2. 124. 1762 [original habitat unknown].—Britton 299.—Keller and Brown 57.

Rocky woods of the northern counties; reported by Dr. Britton from one station in the Middle district.

Middle District.—Arneytown (C).

Family CYPERACEÆ. Sedges.

Distinguished from Grasses by their usually solid, more or less triangular stems and closed sheaths to the leaves. Fruit an achene.

Flowering and Fruiting Data.—In all the genera of this family, except *Cyperus* and *Carex* (q. v.) and certain special cases noted under individual species, the time of year indicates the season during which well developed (and generally mature) achenes are commonly to be found and intact spikelets occur.

Key to Genera.

a. Flowers all of one kind, perfect.

b. Spikelets two-ranked.

c. Flattened or linear, arranged in terminal umbles, in loose spikes or spherical clusters. *Cyperus*, p. 248

cc. Flattened, arranged in two ranks on peduncles from the axils of the short leaves, inflorescens extending for same distance along the culm. *Dulichium*, p. 256

- bb. Spikelets cylindrical or ovate with flowers on all sides, not two-ranked.
 c. No apparent leaves (reduced to mere sheaths). *Elcocharis*, p. 257
 d. Leaves present.

e. Inflorescence in compact heads, provided with soft silky or cotton-like white or whitish hairs, which become long and plume-like in autumn. *Eriophorum*, p. 273

ec. Inflorescence not provided with white or whitish hairs.

f. Flowers 1 to 2 (rarely 3-4) in a spike.

g. Achene, with a conspicuous beak or cap distinctly different from the main portion. *Rynchospora*, p. 275

gg. Achene uniform throughout, no beak.

Cladium, p. 282

ff. Flowers numerous, always more than four in a spikelet.

g. Lowest leaves at least (often whole plant), hispid.

Fuirena, p. 274

gg. Leaves never hispid.

h. Spikelets 1 or 2-12 sessile in a terminal cluster.

Scirpus, p. 266

hh. Spikelets pedicelled, or at least some of them, sometimes several on each pedicel.

i. Plant less than 3.7 dm. high.

j. Leaves filiform, shorter than the inflorescence. *Stenophyllis*, p. 265

jj. Leaves linear, flat.

k. Spikes half a line wide, leaves much shorter than the inflorescence.

Fimbristilis autumnalis, p. 265

kk. Spikes one line wide, leaves equalling inflorescence. *Psilocaria*, p. 265

ii. Plants more than 6 dm. high.

j. Leaves rigid, involute.

Fimbristilis castanea, p. 265

jj. Leaves not involute. *Scirpus*, p. 266

aa. Flowers of two kinds, some staminate, some pistillate.

b. Achene inclosed in a sack or perigynia, open at the tip and often prolonged into a slender toothed beak.

c. Staminate and pistillate flowers in distinct spikes or in different parts of the same spike. *Carex*, section "a," p. 285

cc. Staminate and pistillate flowers, mingled together in (or staminate at the base of) a terminal branching, "prickly" cluster (green or straw color) or in several scattered star-like clusters (green).

Carex, section "aa," p. 288

ccc. Staminate and pistillate flowers, mingled (staminate usually at the base) in uniform ovoid heads, clustered or usually separate, at the end of the scape; each composed of numerous closely imbricated, flat achenes and scales (chestnut or green).

Carex, section "aaa," p. 290

bb. Achene naked, resembling a hard, round, bony seed, supported on a hard disc, generally white and shining sometimes blackish.

Scleria, p. 282

CYPERUS L.

Flowering and Fruiting Data.—The time of year denotes the season during which intact inflorescences, heads, and spikelets of characteristic shape, are present.

Mature achenes are present some times after the season here designated, but the spikelets are then losing their characteristic shape through the dropping of the scales.

Key to the Species.

- a. Spikelets flat, two-ranked and closely imbricated, more than 1.5 mm. wide, sessile in radiating umbels or occasionally one or two secondary umbels on pedicels.
 - b. Edges of the spikelet sharply and finely notched owing to the projecting points of the scales.
 - c. Scales brown with a green keel, tips very sharp, slightly mucronate. Head often proliferous. *C. dentatus*, p. 251
 - cc. Scales yellowish brown, tips not mucronate, not proliferous.
 - d. Spikelets 2 mm. wide or over; maritime. *C. nuttallii*, p. 250
 - dd. Spikelets less than 2 mm. wide, usually several short-pedicelled umbels. *C. microdontus*, p. 251
 - bb. Edges of the spikelet nearly entire, the tips of the scales blunt and not projecting.
 - c. Spikelets yellow or yellowish, 1.5–2.5 mm. broad. *C. flavescens*, p. 249
 - cc. Spikelets brown or green, spotted or bordered with brown.
 - d. Spikelets 5–10 mm. long, branches of the styles projecting from the scales, secondary umbels always present. *C. diandrus*, p. 250
 - dd. Spikelets 10–20 mm. long, smooth and shining, style branches rarely visible, secondary spikelets occasional. *C. rivularis*, p. 250
- aa. Spikelets less than 1.5 mm. wide, often terete in cylindrical spikes at least one inch long, mostly on peduncles which are usually branched and sometimes very compound, forming masses of inflorescence 1–2 dm. or more in diameter.
 - b. Peduncles branched.
 - c. Spikes very dense, scales falling away from the rachis of the spikelet at maturity. *C. erythrorhizos*, p. 252
 - cc. Spikes often loose, scales persistent on the rachis until the spikelet itself falls off.
 - d. Spikelets terete, *C. speciosus*, p. 252
 - dd. Spikelets distinctly flattened. *C. strigosus*, p. 253
 - bb. Peduncles not branched.
 - c. Lower spikelets not reflexed, heads rather loose, roots with small root tubers. *C. esculentus*, p. 252

- cc. Lower spikelets always reflexed, forming a dense ovoid head, no root tubers. *C. lancastriensis*, p. 253
- aaa. Spikelets in several peduncled dense umbels or short spikes (cylindrical, ovoid or top-shaped), not over 15 mm. long (exclusive of reflexed spikelets). Spikelets less than 1.5 mm. in width, or else scales spreading and not closely imbricate and main umbel sessile, with or without secondary pedicelled umbels.
- b. Spikelets linear, appressed, more or less terete, prevailing color brownish.
- c. Umbels globular ovoid or cylindrical, spikelets not bristly pointed, only the basal ones reflexed.
- d. Head globular or ovoid. *C. ovularis*, p. 254
- dd. Head cylindrical. *C. cylindricus*, p. 255
- cc. Umbels ovoid or top-shaped, spikelets bristly pointed, mostly reflexed.
- d. Umbels ovoid, long. *C. lancastriensis*, p. 253
- dd. Umbels top-shaped, 10-25 mm. long, all spikelets reflexed.
- e. Culms glabrous. *C. hystricinus*, p. 253
- ee. Culms scabrous above.
- f. Heads obovoid, contracted at base. *C. retrofractus*, p. 254
- ff. Heads cylindric or subcylindric. *C. dipsaciformis*, p. 254
- bb. Spikelets broader, scales loosely arranged, prevailing color green.
- c. Rachis of spikelet winged, secondary pedicelled umbels always present. *C. grayi*, p. 255
- cc. Rachis of spikelet not winged.
- d. Secondary umbels often lacking.
- e. Spikelets 10-16 mm. long, 8-12 flowered. *C. filiculmis*, p. 256
- ee. Spikelets 3-8 mm. long, 4-8 flowered. *C. f. macilentus*, p. 256
- aaaa. Spikelets as broad as long (3-6 mm.), sessile in compact heads in large compound umbels, forming a mass of inflorescence .5-7 dm. in diameter. *C. pseudovegetus*, p. 251

Cyperus flavescens L. Yellow Sedge.

Pl. XVI., Fig. 9.

Cyperus flavescens Linnæus, Sp. Pl. 46. 1753 [Germany, Switzerland and France.]—Knieskern 33.—Willis 67.—Britton 260.—Keller and Brown 58.

Damp ground, common in our region, except in the Pine Barrens, casual in North Jersey.

Fr.—Early August to early October.

Middle District.—Good Luck Pt. (C), New Egypt, Burlington, Kaighns Pt., Westville, Washington Park (S), Mickleton (NB), Swedesboro (KB), Jericho.

Pine Barrens.—Lakehurst, Chatsworth, Clementon, Hammonton, Atsion, Mays Landing (C), Pleasant Mills.

Coast Strip.—Forked River, Toms River (NB), Palermo, Sea Isle Inc. (S), Wildwood.

Cape May.—Dias Creek.

***Cyperus diandrus* Torrey. Low Sedge.**

Pl. XVI., Fig. 14.

Cyperus diandrus Torrey Cat. Pl. N. Y. 90. 1819 [Salt Meadows at Hoboken, N. J.].—Knieskern 33.—Willis 67.—Britton 260.—Keller and Brown 59.

Damp ground; rare in the Middle district along the Delaware River and more frequent along the coast.

Fr.—Mid-August to early October.

Middle District.—Gloucester Pt., Swedesboro.

Coast Strip.—Barnegat City (L), Harvey Cedars (L), Brant Beach (L), Spray Beach (L), Beach Haven Terrace (L), Holgate's (L), Beach Haven (L), St. Albans (L), Waretown.

***Cyperus rivularis* Kunth. Shining Sedge.**

Pl. XVI., Fig. 13.

Cyperus rivularis Kunth Enum. 2: 6. 1837 [Georgia].—Keller and Brown 59.

Cyperus diandrus var. *castaneus* Knieskern 33.—Willis 67.—Britton 260.

Damp ground; common in the Northern and Middle districts and on the Coastal strip.

Fr.—Mid-August to early October.

Middle District.—New Egypt, Birmingham, Swedesboro, Fish House (S), W. Deptford.

Coast Strip.—Sandy Hook (NB), Spring Lake (NY), Barnegat City (L), Brant Beach (L), Ship Bottom (L), Beach Haven (L), Spray Beach (L), West Creek (S), E. of Egg Harbor City, Palermo (S).

***Cyperus nuttallii* Eddy. Nuttall's Sedge.**

Pl. XVI., Fig. 15.

Cyperus Nuttallii Eddy, Spreng. Neue. Entd. I. 240. 1820 [Submarine Swamps of N. J.].—Knieskern 33.—Torrey Ann. Lyc. N. Y. III. 252. 1836.—Willis 67.—Britton 260.—Keller and Brown 59.

Cyperus minimus Barton, Flor. Phila. I. 26. 1818.—Nuttall, Gen. 1. 35. 1818.

Cyperus Cleaverii Torrey, Ann. Lyc. N. Y. III. 258 [Monmouth Co., N. J.].—Gray, Man. Ed. 2. 491. 1858.

Edges of salt marshes all along the coast and on the bay shore.

Fr.—Early August to early October.

Maritime.—Deal Beach, Sea Bright (NB), Bay Head, Island Heights, Toms River (NB), Seaside Park (S), Waretown, Barnegat City (L), Surf City (L), Ship Bottom (L), Peahala (L), Spray Beach (L), West Creek (S), Atlantic City, Longport, Ocean City (S), Sea Isle City (S), Piermont, Wildwood, Cape May, Dennisville, Beaver Dam.

Cyperus microdontus Torr. Small-toothed Sedge.

Cyperus microdontus Torrey, Am. Lyc. N. Y. III.: 255. 1836 [Salem, N. C.].
—Robinson and Fernald, Gray's Man. Ed. 7, 174.—Emile F. Williams,
Rhodera III. 1901, 36.

Only known in the State from a specimen in the Gray herbarium, collected by Dr. J. B. Brinton, August 1, 1880, at Cape May, but labelled *C. nuttallii*; from Pleasant Mills, where it was discovered September 27, 1887, by Mr. C. A. Gross, possibly from the shores of Mullica River, within the limits of tidewater; and from Claypot Creek, Navesink Highlands, where it was obtained by Mr. E. F. Williams, September 2, 1900, and identified by Prof. Fernald. Previously not known from north of Virginia.

Fr.—Early August to early October.

Coast Strip.—Navesink (E. F. Williams), Pleasant Mills, Cape May (Gray Herb.).

Cyperus pseudovegetus Steud. Marsh Sedge.

Pl. XVI., Fig. 7.

Cyperus pseudovegetus Steud., Syn. Pl. Cyp. 24. 1855 [So. Carolina].—Stone Torrey, 1907, 40.

Lower portion of the Middle district. Discovered near Riddleton, September 16, 1894, by Charles D. Lippincott. Rare.

Fr.—Early July to early October.

Middle District.—Riddleton.

Cyperus dentatus Torr. Toothed Sedge.

Pl. XVI., Fig. 8.

Cyperus dentatus Torrey, Fl. U. S. I. 61. 1824 [Pine Barrens of New Jersey].—Knieskern 34.—Torrey Ann. Lyc. N. Y. III., 271. 1836.—Willis 67.
—Britton 260.—Keller and Brown 59.

Cyperus parviflorus Barton, Fl. Phila. I.: 28. 1818.

Wet sandy spots in the Pine Barrens and locally in the Northern and Middle districts.

We have both the typical form, which has the spikelets frequently abortive, and the var. *ctenostachys* of Fernald, which seems to me to be merely a fully developed normal extreme of the same thing.

Fr.—Late July to late September.

Middle District.—Burlington, Delanco, Medford (S), Riddleton (KB), Elwood (KB).

Pine Barrens.—Asbury Park (NB), Bay Head, Lakehurst, Toms River, Browns Mills Jnc. (KB), Forked River (H), Waretown, Pasadena, Speedwell, Chatsworth, Taunton, Berlin, Bear Swamp, Hammonton, Atsion, Parkdale, Quaker Bridge, Batsto, Pleasant Mills, Weekstown, Egg Harbor City, Mays Landing (KB).

***Cyperus esculentus* L. Nut Grass.**

Pl. XVI., Fig. 16..

Cyperus esculentus Linnæus, Sp. Pl. 45. 1753 [Monspelii].—Britton 260.

Cyperus phymatodes Barton, Flor. Phila. I.: 27. 1818.—Willis 67.

Cyperus repens Torrey, Ann. Lyc. N. Y. III.: 264. 1836.

Common in open swampy ground, except in the Pine Barrens; most plentiful on the coastal strip, often increasing enormously where swamp land is cultivated.

Fr.—Early August to late September or early October.

Middle District.—Phalanx (NB), New Egypt, Lawnside (S), Swedesboro, Salem (S).

Pine Barrens.—Landisville (T).

Coast Strip.—Spring Lake (NB), Seaside Park, Beach Haven Terrace (L), Surf City (L), Tucker's (L), Atlantic City (S), Palermo (S), Ocean City (S), Mays Landing, Sea Isle Jnc. (S), Piermont, Anglesea, Cold Spring, Cape May (S), Cape May Pt. (S).

***Cyperus erythrorhizos* Muhl. Red-rooted Sedge.**

Pl. XVI., Fig. 12.

Cyperus erythrorhizos Muhlenberg, Gram. 20. 1817 [Pennsylvania].—Willis 67.—Britton 261.

Locally in swampy ground of the Middle and Coast districts.

Found abundantly along Big Timber Creek, near Westville. September, 1911, by Mr. Bayard Long.

Fr.—Mid-August into October.

Middle District.—Camden (NB), Petty's Isl. (NB), Westville, Swedesboro, Millville.

Coast Strip.—Anglesea (UP).

***Cyperus speciosus* Vahl. Michaux's Sedge.**

Pl. XVI., Fig. 11.

Cyperus speciosus Vahl., Emun. 2: 364. 1806 [Virginia].—Britton 261.—Keller and Brown 60.

Cyperus Michauxianus Willis 67.

Swamps along the coast, also at Camden (probably on ballast).

Fr.—Early August to late September.

Middle District.—Camden.

Coast Strip.—Seaside Park, Waretown, Barnegat City (L), Surf City (L), Spray Beach (L), Atlantic City (S), Ocean City (S), Piermont, Stone Harbor, Wildwood, Cape May (KB).

Cape May.—Dennisville (S).*

***Cyperus strigosus* L. Straw-colored Sedge.**

Pl. XVI., Fig. 10.

Cyperus strigosus Linnæus, Sp. Pl. 47. 1753 [Jamaica and Virginia].—Barton Fl. Phila. I.; 27. 1818.—Knieskern 34.—Willis 67.—Britton 261.

Cyperus strigosus var. *capitatus* Britton 261 (dwarfed).

Plentiful in swamps and moist open ground throughout the State except in the Pine Barrens. Very variable, but not satisfactorily divisible into definite varieties.

Fr.—Early August to late September.

Middle District.—New Egypt (S), Camden, Morris, Medford, Taunton (S), W. Deptford, Lawnside (S), Mickleton, Tomlin, Wenonah, Clementon, Swedesboro, Salem (S), Millville, Beaver Dam.

Pine Barrens.—Landisville.

Coast Strip.—Barnegat City (L), Surf City (L), Harvey Cedars (L), Ship Bottom (L), Barnegat City Inc. (L), Spray Beach (L), Barrel Isl. (L), West Creek (S), Ocean City (S), Seaville (S), Sea Isle City (S), Wildwood, Cold Spring (S), Cape May (S).

***Cyperus lancastricensis* Porter. Lancaster Sedge.**

Pl. XVI., Fig. 1.

Cyperus lancastricensis Porter, Gray's Manual, Ed. V. 555. 1867 [Banks of the Susquehanna, Lanc. Co., Pa.].—Watson, Gray's Man., Ed. VI. 572. 1890.—Britton 261.—Keller and Brown 60.

Locally in sandy soil, Middle district and on the Delaware below Trenton.

Fr.—Late July to early October.

Middle District.—Centerville (C), Near Woodbury, Swedesboro.

***Cyperus hystricinus* Fernald. Bristling Sedge.**

Pl. XVI., Fig. 2.

Cyperus hystricinus Fernald, Rhodora, July, 1906: 127 [near Haddonfield, N. J.]

Cyperus retrofractus Britton 261 (in part).—Keller and Brown 60 (in part).

* The records for Mays Landing (C) and Hammonton (KB) on authority of Benj. Heritage prove to be *C. dentatus*.

Locally in the Middle district.

Fr.—Late July to late September.

Middle District.—Red Bank, Westville, Washington Park (S), National Park, Malaga (S), Locust Grove, Swedesboro (CDL).

Pine Barrens.—Hammonton.

***Cyperus retrofractus* (L.). Rough Sedge.**

Scirpus retrofractus Linnæus, Sp. Pl. 50. 1753 [Virginia].

Mariscus retrofractus Barton, Fl. Phila. I. 30. 1818.—Torrey Ann. Lyc. N. Y.

III. 283. 1836.—Willis 67.

Cyperus retrofractus Britton 261.—Keller and Brown 60.

Locally in the Middle and Pine Barren districts and near Hoboken to the northward.

Fr.—Late July to late September.

Middle District.—Medford (S), Locust Grove, Malaga.

Pine Barrens.—Weymouth.

***Cyperus dipsaciformis* Fernald. Teasel-like Sedge.**

Cyperus dipsaciformis Fernald, Rhodora 106, p. 127 [near Washington, D. C.].

I am informed by Prof. M. L. Fernald that there is a specimen in the Gray Herbarium from the herbarium of Thomas Morong, labelled in Morong's handwriting "Sandy Pine Barrens, New Jersey, Coll. Morong, September, 1873." This is our only evidence of its occurrence in our region.*

***Cyperus ovularis* (Michx.). Globose Sedge.**

Pl. XVI., Fig. 4.

Kyllingia ovularis Michaux, Fl. Bor. Am. I. 29. 1803 [Georgia and Carolina].

Mariscus glomeratus Barton, Fl. Phila. I. 30. 1818.

Cyperus ovularis Knieskern 34.—Willis 67.—Britton 261.—Keller and Brown 60.

Common in open sandy ground throughout our region, except in the Pine Barrens, and casual in the northern counties.

Fr.—Early July to early September.

* A specimen collected many years ago by S. W. Conrad at Fish House on the Delaware, and now in the Philadelphia Academy Herbarium, has been identified by Dr. Britton as *Cyperus refractus*. The plant, however, is abortive and not well developed, and I do not think it can be certainly identified with this species. There is no other record for the state.

Middle District.—New Egypt, Burlington, Arney's Mt. (S), Delaire, Medford (S), Swedesboro (CDL).

Coast Strip.—Manahawkin, Surf City (L), Ship Bottom (L), Barrel Isl. (L), Atlantic City (KB), Palermo (S), Holly Beach (UP).

Cape May.—Three mi. W. Court House (S), Dias Creek, Rio Grande, Bennett, Cold Spring, Cape May.*

***Cyperus cylindricus* (Ell.). Pine Barren Sedge.**

Pl. XVI., Fig 3.

Mariscus cylindricus Elliott, Bot. S. C. and Ga. I. 74. 1816 [probably South Carolina].

?*Mariscus echinatus* Barton, Fl. Phila. I. 1818.

Cyperus kyllingæoides Pursh, Fl. Am. Sept. I. 50.

Cyperus Torreyi Britton 261.

Cyperus cylindricus Keller and Brown 60.

Open sandy ground, common throughout the Pine Barrens, Cape May and Coast districts, rare and local in the Middle district.

Fr.—Late July to mid-September.

Middle District.—Lindenwold, Dividing Creek.

Pine Barrens.—Hornerstown, Lakelhurst, Toms River (NB), Woodmansie (KB), Forked River, Bear Swamp (S), Taunton, Lucaston, Albion, Landisville, Winslow (S), Parkdale, Forks of Batsto, Egg Harbor City, Tuckahoe (S).

Coast Strip.—Manahawkin, St. Albans (L), Beach Haven (L), Surf City (L), Sherburn's (L), Atlantic City, Palermo (S), Ocean City (S), Piermont, Wildwood, Anglesea, Holly Beach.

Cape May.—Bennett, Cold Spring (S).

***Cyperus grayi* Torr. Gray's Sedge.**

Pl. XVI., Fig. 6.

Cyperus Grayii Torrey, Ann. Lyc. N. Y. III. 268. 1836 [Pine region of New Jersey].—Knieskern 34.—Willis 67.—Britton 261.—Keller and Brown 61.

Common on the sandhills of the coast and in the Pine Barrens. Rare and local in the Middle district.

Fr.—Early August to late September.

Middle District.—New Egypt, Camden.

Pine Barrens.—Manchester (NB), Weymouth Island Hts. Inc., Forked River, Speedwell, Chatsworth, Taunton (S), Clementon, Penbryn (S), Waterford, Franklinville, Landisville, Atsion (S), Pleasant Mills, Weymouth.

*The records for Hammonton and Forked River (KB) reported by Benj. Heritage and J. Crawford prove to be the next.

Coast Strip.—Sandy Hook (C), Pt. Pleasant, Seaside Park (S), Waretown, Forked River (NY), Barnegat City (L), Spray Beach (L), Sherburn's (L), West Creek (S), Atlantic City, Ocean City (S), Sea Isle City (S), Piermont, Stone Harbor, Wildwood, Cape May Pt. (S).

***Cyperus filiculmis* Vahl. Slender Sedge.**

Cyperus filiculmis Vahl Enum., II. 328. 1806 [Carolina].—Knieskern 34.—Willis 67.—Keller and Brown 60.

Cyperus autumnalis Barton Fl. Phila. I. 28. 1818.

Common, perhaps, in the northern counties, but rare in our limits, spreading along railroads, etc.

Fr.—Late June into October.

Middle District.—Woodbury, Kaighns Pt., Wenonah.

Cape May.—Court House, Cape May.

***Cyperus filiculmis macilentus* Fernald.**

Pl. XVI., Fig. 5.

Cyperus filiculmis var. *macilentus* Fernald Rhodera, July, 1906: 128 [Orono, Me.].

Dry sandy soil; most plentiful along the sand-dunes of the coast, also in the Pine Barrens and Middle districts.

Fl.—Late June into October.

Middle District.—New Egypt, Fish House, Morris, Woodbury, Washington Park, Wenonah, Lawnside (S), Lindenwold (S), Mickleton, Swedesboro, Beaver Dam.

Pine Barrens.—Vineland, Landisville, Bamber, Twelfth St., Albion, Forks of Batsto, Egg Harbor City.

Coast Strip.—Asbury Park (NB), Pt. Pleasant, West Creek (S), Surf City (L), Barnegat City (L), Ship Bottom (L), Peahala (L), Tucker's (L), St. Albans (L), Sherburn's (L), Barrel Isl. (L), Longport (S), Atlantic City (S).

Cape May.—Fishing Creek (OHB), Cape May (OBH), Cape May Pt.

DULICHIMUM. L. C. Richard.

***Dulichium arundinaceum* (L.). *Dulichium*.**

Pl. XVII., Fig. 4.

Cyperus arundinacea Linnæus, Sp. Pl. 44. 1753 [Virginia].

Dulichium spathaceus Barton, Fl. Phila. I.: 30. 1818.—Knieskern 34.—Willis 67.—Britton 262.

Common in wet swamps and along the edge of streams in the Northern, Middle and Coastal districts. The few Pine Barren records seem to have followed up the tidewater streams.

Fr.—Mid-July into October.

Middle District.—New Egypt, Florence, Birmingham, Delanco (S), Medford (S), Lindenwold, Paulsboro, Swedesboro, Sharpstown, Dividing Creek.

Pine Barrens.—Toms River (NY), Lakehurst, Forked River, Waretown, Bear Swamp (S), Hammonton (NY), Landisville, Petersburg (S), Egg Harbor (NB).

Cape May.—Cape May, Town Bank.

ELEOCHARIS R. Brown.

Key to the Species.

- a. Spikes 2-6 cm. long of nearly or quite the same diameter as the culms.
 - b. Scales blunt and rounded, spike blunt, cylindrical.
 - c. Culm, four-angled. *E. quadrangulata*, p. 258
 - cc. Culm terete. *E. interstincta*, p. 258
 - bb. Scales sharp pointed, spike linear, awl-shaped. *E. robbinsii*, p. 258
- aa. Spike much thicker than the culm.
 - b. Spike 6-15 mm. long.
 - c. Mature spikes at least 3 mm. thick.
 - d. Scales pointed, tips spreading.
 - e. Culms 3-15 dm. tall, stout. *E. palustris*, p. 260
 - ee. Culms 2-4.5 dm. tall, slender. *E. glaucescens*, p. 260
 - dd. Scales blunt, spikes more or less globose.
 - e. Scales short and rounded, closely imbricated.
 - f. Spikes globose. *E. obtusa*, p. 259
 - ff. Spikes oblong, cylindric. *E. engelmanni*, p. 260
 - ee. Scales longer and more loosely arranged.
 - f. Scales brown with a lighter mid-vein. *E. melanocarpa*, p. 262
 - ff. Scales greenish with a dark mid-vein.
 - g. Spike ovoid, culms not rooting at tip. *E. tuberculosa*, p. 261
 - gg. Spike spindle shaped, sterile culms often rooting at tip. *E. rostellata*, p. 264
 - cc. Mature spikes less than 3 mm. thick.
 - d. Scales minute, rounded, closely imbricated, spike cylindrical, 6-15 mm. long. *E. tricotata*, p. 262
 - dd. Scales larger, more loosely arranged, spikes 4-6 mm. long. *E. tenuis*, p. 263
 - bb. Spikes 2-6 mm. long.
 - c. Culms spirally twisted. *E. tortilis*, p. 263
 - cc. Culms not twisted.
 - d. Culms 2-4 dm. high. *E. tenuis*, p. 263
 - dd. Culms not over 2 dm. high (seldom over 1-5 dm.).
 - e. Culms capillary.
 - f. Spikes two to six-flowered, 1 mm. broad. *E. acicularis*, p. 260
 - ff. Spikes six to many-flowered, culms often proliferous. *E. torreyana*, p. 261
 - ee. Culms thicker.

f. Spikes 2 mm. broad, scales reddish brown, with a green mid-vein. *E. olivacea*, p. 259

ff. Spikes 2-3 mm. broad, scales very pale.

E. ocreata, p. 259

***Eleocharis interstincta* (Vahl.). Knotted Spike-rush.**

Pl. XVII., Fig. 5.

Scirpus interstinctus Vahl, Emun. II.: 251. 1806 [Caribaeis].—Keller and Brown 61.—Stone, Proc. Acad. Nat. Sci., Phila., 1908. 458.

Known only from a swamp at Repaupo in the Middle district, where it was first discovered by Benjamin Heritage, July 15, 1892.

Fr.—Mid-July to late August.

Middle District.—Repaupo.

***Eleocharis quadrangulata* Michx. Quadrangular Spike-rush.**

Pl. XVII., Fig. 6.

Scirpus quadrangulatus Michaux, Fl. Bor. Am. I. 30. 1803 [Carolina].

Eleocharis quadrangulata Torrey, Ann. Lyc. N. Y. III. 297. 1836.—Willis 68.

Eleocharis mutata Britton, Jour. N. Y. Micros. Soc. V. 98. 1889.—Britton 262.—Keller and Brown 62.

Found in our region only in wet swamps in the Cape May district, but occurs also at Swartswood Lake, Sussex Co.

Fr.—Mid-July to mid-August.

Cape May.—Dennisville, Dias Creek, Bennett, Cape May.

***Eleocharis robbinsii* Oakes. Robbin's Spike-rush.**

Pl. XVII., Fig. 7.

Eleocharis Robbinsii Oakes, Hovey's Magazine VII. 178. 1848 [Pondicherry pond, Jefferson, N. H.].—Willis 67.—Britton, Jour. N. Y. Micros. Soc. V. 99. 1889.—Gray Manual Ed. V. 557. 1867.—Britton 262.—Keller and Brown 62.

Growing in the water in Pine Barren streams and ponds, frequent; rare and local in similar situations in the Middle district.

Fr.—Mid-July to mid-September, good fruit somewhat infrequent.

Middle District.—Delanco, Union Grove (S), Fairton.

Pine Barrens.—Toms River, Forked River, Dover Forge, Pasadena, Pleasant Mills, Mullica River, Quaker Bridge, Chatsworth, Hammonton, Berlin, Browns Mills (H), Dennisville.

Cape May.—Town Bank.

Eleocharis ocreata (Nees.). **Pale Spike-rush.**

Pl. XVII., Fig. 14.

Eleocharis ocreatus Nees., in Mart. Fl. Bras. II. Part 1. 102. 1842 [Bahia, Rio Janiero, etc.].—Stone Proc. Acad. Nat. Sci. Phila. 1908. 458.

Restricted to the southern part of the Cape May peninsula, where it was first found by Mr. S. S. Van Pelt on the shores of Lily Lake, July 17 and September 16, 1905.

Cape May.—Cape May Pt.

Eleocharis olivacea Torr. **Green Spike-rush.**

Eleocharis olivacea Torrey, Ann. Lyc. N. Y. III. 300. 1836 [Pine Barrens of New Jersey].—Knieskern 34.—Willis 68.—Britton 262.—Keller and Brown 62.

Frequent in moist open ground throughout the State, but most plentiful in the Pine Barrens and along the coast.

Fr.—Late July into October.

Middle District.—New Egypt, Hainesport, Birmingham, Delaire, Mickleton (H), Swedesboro, Millville, Beaver Dam.

Pine Barrens.—Lakehurst, Browns Mills, Bamber, Chatsworth, Jackson, Clementon, Atco, Landisville, Hammonton, Parkdale, Atsion, Batsto, Forks of Batsto, Pleasant Mills, Quaker Bridge, Absecon (Bassett).

Coast Strip.—Seaside Park, Forked River, Waretown, Manahawkin, Surf City (L), Absecon (S), Palermo.

Cape May.—Bennett, Cape May, Cape May Pt. (S).

Eleocharis obtusa (Willd.) **Obtuse Spike-rush.**

Pl. XVII., Fig. 17.

Scirpus obtusus Willdenow, Enum. Hort. Berol. 76. 1809 [North America].

Eleocharis obtusa Knieskern, 34.—Willis 68.

Eleocharis ovata Britton 262.

Common throughout the State except in the Pine Barrens, where it is found only along tidewater streams or introduced in cultivated ground.

Fr.—Mid-June to early October.

Middle District.—Keyport (NY), New Egypt, Delanco, Birmingham, Delaire, Camden, Lindenwold, Woodbury, Swedesboro, Clementon, Millville.

Pine Barrens.—Pleasant Mills (T), Landisville, Four mi. E. Hammonton (S), Mays Landing.

Coast Strip.—Deal, Manahawkin, Anglesea.

Cape May.—Court House (S), Bennett (S), Cape May.

Eleocharis engelmanni Steud. Engelmann's Spike-rush.

Eleocharis engelmanni Steud, Syn. Pl. Cyp. 79. 1855 [St. Louis, Mo.].

Eleocharis ovata var. *engelmanni* Britton Jour. N. Y. Micros. Soc. V. 103. 1889.—Britton 262.

Reported in our region only from Kaighns Point. Occasionally in the northern counties.

Fr.—Mid-June to late August.

Middle District.—Blackwoodstown Turnpike (from Chas. E. Smith's Herbarium and doubtless the specimens reported on his authority in Britton's Catalogue from "Kaighns Pt.").

Eleocharis palustris (L.). Creeping Spike-rush.

Scirpus palustris Linnæus, Sp. Pl. 47. 1753 [Europe].

Eleocharis palustris Keller and Brown 62.

Wet swamps; rather frequent in the northern counties, rare and local in the Middle and Coast districts. The record in Britton's Catalogue for Gloucester Co. belongs to the next.

Middle District.—New Egypt.

Coast Strip.—N. Wildwood.

Eleocharis glaucescens Willd. Glaucous Spike-rush.

Pl. XVII., Fig. 11.

Scirpus glaucescens Willdenow, Enum. 76. 1809 [North America].

Eleocharis palustris var. *glaucescens* Britton 262.

Common in swamps in the Northern, Middle and Coast districts to Cape May.

There seem to be two forms of this species as pointed out to me by Mr. Bayard Long. Those marked with an asterisk have a yellow achene with a nearly sessile truncate beak, while in the others the achene is brown with an acute pedicelled beak.

Fl.—Mid-June to late August.

Middle District.—Delanco, Lindenwold, Medford, Tomlinson's.

Coast Strip.—Deal,* Pt. Pleasant, Manahawkin,* Spray Beach (L), Barnegat City (L),* Surf City (L),* Ship Bottom (L),* St. Albans (L), Mays Landing (T), Piermont,* Wildwood (S), Cold Spring.

Cape May.—Dias Creek,* Cape May.*

Eleocharis acicularis (L.). Needle Spike-rush.

Pl. XVII., Fig. 15.

Scirpus acicularis Linnæus, Sp. Pl. 48. 1753 [Europe].

Eleocharis acicularis Knieskern 34.—Willis 68.

Scirpus trichodes Barton Fl. Phila. I. 32. 1818.

Wet muddy places, shores of streams, etc. Common in the Northern and Middle districts, occurs also in the Cape May peninsula.

Fr.—Mid-July into October; good fruit quite uncommon.

Middle District.—New Egypt, Delanco (S), Swedesboro, Millville, Mantua (H).

Pine Barrens.—Landisville.

Cape May.—Nummerytown (S), Cold Spring (OHB).

***Eleocharis tuberculosa* (Michx.). Tuberled Spike-rush.**

Pl. XVII., Fig. 8.

Scirpus tuberculosus Michaux, Fl. Bor. Am. I. 30. 1803 [Lower Carolina].

Eleocharis tuberculosa Knieskern 34.—Beck Botany 424. 1833.—Torrey, Ann.

Lyc. N. Y. III. 307. 1836.—Willis 68.—Britton Jour. N. Y. Micros. Soc.

V. 106. 1889.—Britton 262.—Keller and Brown 62.

Wet sandy ground throughout the Pine Barrens and Cape May districts, rare and local in the lower part of the Middle district. This is the characteristic *Eleocharis* of the Pine Barrens, taking the place of *E. obtusa* of the Middle district. Its occurrence outside the Pines is limited to the so-called Pine Barren Islands of west Jersey.

Fr.—Mid-July to mid-September.

Middle District.—Shark River, Griffith's Swamp, Centerton (S), Dividing Creek.

Pine Barrens.—Allaire, Lakehurst, Toms River (S), Island Heights, Forked River, Brindletown, Manahawkin, Mayetta, West Creek, Speedwell (S), White House (S), Bear Swamp, Berlin, Atco, Jackson, Landisville, Hamonton (S), Parkdale (S), Atsion, Quaker Bridge, Pleasant Mills, Forks of Batsto (S), Egg Harbor City, Cologne, Pancoast (S), Eighth St. (T), Mays Landing (S), Manumuskin (S), Sea Isle Jnc.

Coast Strip.—Sherburn's (L).

Cape May.—Cold Spring (S), Bennett, Cape May.

***Eleocharis torreyana* Boeckl. Torrey's Spike-rush.**

Pl. XVII., Fig. 16.

Helicocharis Torreyanus Boeckl, Linnæa 36, 440. 1870 [new name for "*E. microcarpa* b ? *filiculmis* Torrey," Pine Barrens of N. J.].

Eleocharis microcarpa Willis 68.—Britton Jour. N. Y. Micros. Soc. V. 107. 1889.—Britton 263.—Keller and Brown 62.

Eleocharis microcarpa b ? *filiculmis* Torrey, Gray's Manual, Ed. I. 525. 1848.

Restricted to damp sandy spots in the Pine Barrens and upper part of the Cape May district.

Originally described by Torrey from specimens collected in the New Jersey Pine Barrens, apparently in Ocean County.

Fr.—Early July to early October.

Pine Barrens.—Forked River (H), Double Trouble, Bamber, Manahawkin, Speedwell (S), Pleasant Mills, Quaker Bridge (C), Ballinger's Mill (S), Twelfth St. Folsom, Williamstown Jnc., Egg Harbor City.

Cape May.—Anglesea Jnc., Bennett Court House (S), Cold Spring.

***Eleocharis melanocarpa* Torrey. Black-fruited Spike-rush.**

Pl. XVII., Fig. 9.

Eleocharis melanocarpa Torrey, Ann. Lyc. N. Y. III. 311. 1836 [Pine Barrens near Savannah, Ga.].—Willis 68.—Britton 263.—Stone, Proc. Acad. Nat. Sci. Phila. 1908. 458.—Long, Bartonian II. 18. 1910.

Apparently restricted to the lower part of the Middle district. The first specimens I have seen from the State were collected at Delanco, August, 1907, by Messrs. S. S. Van Pelt, Stewardson Brown and the writer. The plant was quite plentiful then, and the tips of the leaves were rooting after the manner of *E. rostellata*.

The earlier published records "Pine Barrens," Parker, and "Sandy Swamps, Monmouth Co.," Willis, unsupported by specimens may be regarded with suspicion, at least until we obtain other records from the Pines.

Fr.—Early July to mid-August, probably.

Middle District.—Delanco, Below Millville.

Cape May.—Bennett.

***Eleocharis tricostata* Torr. Three-ribbed Spike-rush.**

Pl. XVII., Fig. 10.

Eleocharis tricostata Torrey, Ann. Lyc. N. Y. III. 310. 1836 [Georgia and Florida].—Knieskern 34.—Willis 68.—Gray Manual Ed. I. 524. 1848.—Britton Jour. N. Y. Micros. Soc. V. 108. 1889.—Britton 263.—Keller and Brown 62.

Swamps in the Cape May and Pine Barren districts; rare and local in the Middle district.

Dr. Knieskern first detected this species in the State at Quaker Bridge, but it has since proved to be not uncommon, especially in the Cape May peninsula.

Fr.—Early July to late August.

Middle District.—Delanco.

Pine Barrens.—Double Trouble, Quaker Bridge (C), Williamstown Inc., Inskip, Newtonville, Grassy Pond, Twelfth St. and Jackson Road, Egg Harbor City.

Cape May.—Bennett, Whitesboro, Nummeytown (S), Rio Grande.

Eleocharis tenuis* (Willd.). Slender Spike-rush.

Pl. XVII., Fig. 18.

Scirpus tenuis Willdenow, Enum. Hort. Berol. I. 76. 1809 [North America].

Scirpus filiformis Pursh Fl. Am. Sept. I. 54.

Eleocharis tenuis Knieskern 34.—Torrey Ann. Lyc. N. Y. III. 309. 1836.—Willis 68.—Britton 263.

Damp places; common throughout the State.

Fr.—Early June to early July; scales then drop during July, but achenes persist on the rachis often until October.

Middle District.—New Egypt, Burlington, Delanco (S), Camden, Lawnside (S), Tomlinson's Glassboro (S), Swedesboro, Riddleton, Millville.

Pine Barrens.—Allaire, Toms River, Forked River, Manahawkin, West Creek, E. and W. Plains, Landisville, New Germany, Weymouth.

Coast Strip.—Spray Beach (L).

Cape May.—Cape May (OHB).

***Eleocharis tortilis* (Link.). Twisted Spike-rush.**

Pl. XVII. Fig. 13.

Scirpus tortilis Link, Jahrb. III. 78. 1820 [North America].

Moist open ground; rare and local in the southern Middle district, but more common in the Cape May peninsula. Reaches its northern limit in southern New Jersey.

This interesting species easily recognized by its spirally twisted stem, was first collected in the State by Mr. Chas. D. Lippincott, September 6, 1896, near Swedesboro.

Fr.—Early July to early September.

Middle District.—Two miles north of Swedesboro.

Cape May.—Dias Creek, West Cape May, Cold Spring (OHB).

* *Eleocharis intermedia* Muhlenberg [Gram. 31. 1817—Pennsylvania] is given in Britton's Catalogue as rare and local in Northern New Jersey. It was recorded by Willis from Ocean and Monmouth Counties, but this record has been rejected by Dr. Britton, and as Mr. Heritage's record in Keller and Brown's Catalogue proves to be *E. olivacea*, the species seems to have no place in our list.

Eleocharis rostellata Torr. Beaked Spike-rush.

Pl. XVII., Fig. 12.

Scirpus rostellatus Torrey, Ann. Lyc. N. Y. III. 318. 1836 [Penn Yan Yates Co. N. Y. and So. Carolina].

Eleocharis rostellata Willis 68.—Britton Jour. N. Y. Micros. Soc. V. 110. 1889.—Britton 262.—Keller and Brown 63.

Common along the edge of the salt marshes of the coast and on the Hackensack marshes north of our limits.

This species is noted for the rooting of the tips of the sterile scapes, which thus form loops or arches that continually catch the feet as one walks through the meadows.

Fr.—Late June to mid-August.

Maritime.—Ocean Grove, Pt. Pleasant, Seaside Park, Barnegat Pier, Manahawkin, Spray Beach (L), Beach Haven (L), Sherburn's (L), Atlantic City (C), Somers Pt., Cape May Ct. House, Cold Spring, Cape May (S), Dennis.

DICHROMENA Michaux.***Dichromena colorata* (L.). Narrow-leaved Dichromena.**

Schoenus coloratus Linnæus, Sp. Pl. 43. 1753 [Jamaica and Bahamas].

Dichromena leucocephala Gray Man. Ed. I. 531. 1848.—Willis 69.

Dichromena cephalotes Britton 263.

The occurrence of this plant in New Jersey seems to be based upon the statement in the first edition of Gray's Manual (1848), where this State is included in the range, though upon what evidence it is now impossible to ascertain: No one is quoted as authority, and Prof. Fernald writes me that he can find no specimens, that might have been responsible for the record, in the Gray Herbarium.

Willis gives it as occurring in "wet places among the pine forests, Ocean and Monmouth Counties," but it is not mentioned by Knieskern, and Willis' statement was doubtless based upon Gray. Britton simply quotes Gray and Willis, adding "not recently collected."

Notwithstanding the lack of specimens or any definite information, New Jersey is quoted in the range of the plant in all the manuals down to the present time.

It is included here simply to emphasize the facts regarding its reported occurrence in the State, which up to the present time I have been utterly unable to substantiate.

PSILOCARYA Torrey.***Psilocarya nitens* (Vahl.).**

Scirpus nitens Vahl, Emun. 2. 272. 1806 [Carolina].—Long, Barton II. 18, 1910.

Very rare in the lower part of the Cape May peninsula, where it was collected by Mr. O. H. Brown in September, 1909.

Cape May.—Cape May.

STENOPHYLLUS Rafinesque.***Stenophyllus capillaris* (L.). Hair-like Sedge.**

Pl. XVII., Fig. 3.

Scirpus capillaris Linnæus, Sp. Pl. 49. 1753 [Virginia].—Barton, Fl. Phila. I. 34. 1818.

Fimbristylis capillaris Knieskern 34.—Willis 69.—Britton 263.

Isolepis capillaris Torrey Ann. Lyc. N. Y. II. 351. 1836.

Common in dry ground in the Northern and Middle districts and Coastal strip to Cape May. Rare and probably introduced in the Pine Barrens. Both this and the next are often weeds along railroads, etc.

Fr.—Early August to late September.

Middle District.—Burlington, Morris, Camden, Bridgeport, Tomlin, Swedesboro.

Pine Barrens.—Speedwell (S), Landisville (T), Mays Landing (NB), Tuckahoe.

Coast Strip.—Sherburn's (L), Ship Bottom (L), Barrel Isl. (L), West Creek (S), Palermo (S), Cape May (S).

FIMBRISTYLIS Vahl.

Pl. XVII., Fig. 2.

***Fimbristylis autumnalis* (L.). Autumnal Sedge.**

Scirpus autumnalis Linnæus, Mant. II. 180. 1771 [Virginia].—Pursh, Fl. Amer. Sept. I. 57. 1814.—Barton, Fl. Phila. I. 34. 1818.

Fimbristylis autumnalis Knieskern 34.—Willis 68.—Britton 263.

Trichostylis mucronulatus Torrey, Am. Lyc. N. Y. III. 355. 1836.

Common in moist ground, throughout the State.

Fr.—Mid-August to late September.

Middle District.—New Egypt, Delanco, Camden, Lawnside (S), Clementon, Medford (S), Swedesboro, Dividing Creek.

Pine Barrens.—Berlin, Landisville (T), Main Road Sta., Mays Landing.

Coast Strip.—Coxe's, West Creek (S), N. Beach Haven (L), Beach Haven Terrace (L), Sherburn's (L).

Cape May.—Dennisville (S), three miles west Court House (S), Cape May (OHB).

***Fimbristylis castanea* (Michx.). Chestnut Sedge.**

Pl. XVII., Fig. 1.

Scirpus castaneus Michaux, Fl. Bor. Am. I. 31. 1803 [Florida].

Fimbristylis spadicæa Knieskern 34.—Torrey, Am. Lyc. N. Y. III. 346. 1836.
—Willis 68.

Scirpus ferrugineus Torrey, Fl. U. S. I. 53. 1824.—Muhlenberg, Gram. 35. 1817.

Scirpus spadicæus Muhlenberg, Gram. 35. 1817.

Fimbristylis castanea Britton 263.—Keller and Brown 63.

Common in salt marshes all along the coast and rarely in sandy swamps in the Pine Barrens. None of the lists refer to this species as occurring away from the coast, although specimens collected by Cooper at Quaker Bridge have long been in the Academy herbarium; they and other Pine Barren material show no difference whatever from the maritime plant.*

Fr.—Early August to late September.

Pine Barrens.—Atsion, Quaker Bridge, Cedar Grove (S), Hammonton (T).

Maritime.—Pt. Pleasant, Manahawkin, Surf City (L), Beach Haven (L), Sherburn's (L), Atlantic City, Ocean City, Palermo, Mays Landing (NB), Sea Isle City, Piermont, Stone Harbor, Holly Beach, Anglesea, Anglesea Jnc. (S), Cape May (S).

SCIRPUS L.

Key to the Species.

- a.* Spikelet single, terminal.
 - b.* Plants not over .5 dm. high. *S. nanus*, p. 267
 - bb.* Plants 1.5-9 dm. high.
 - c.* 1.5-3.5 dm. tall. terrestrial. *S. planifolius*, p. 268
 - cc.* 3-9 dm. long, floating. *S. subterminalis*, p. 268
- aa.* Spikelets several, sessile, with a single bract.
 - b.* Culms terete or nearly so, .7-6 dm. tall, spikelets 5-10 mm. long.
 - c.* Achene biconvex. *S. debilis*, p. 268
 - cc.* One face of the achene flat.
 - d.* Bristles wanting. *S. smithii*, p. 269
 - dd.* Bristles present. *S. s. setosus*, p. 269
 - bb.* Culms sharply 3-angled, usually over 6 dm. tall, spikelets 5-15 mm. long.

* In Ann. Lyc. N. Y. III. 345. 1836. Dr. Torrey mentions a specimen of *F. congesta* [= *F. vahlii*] in the Herbarium of the Philadelphia Academy from New Jersey, but I do not find it.

- c. Involucral leaf blunt. *S. torreyi*, p. 270
- cc. Involucral leaf pointed.
 - d. Plant smaller, 3-12 dm. tall; involucral leaf 35-100 mm. *S. americanus*, p. 269
 - dd. Plant larger, 6-21 dm. tall; involucral leaf 12-35 mm. *S. olneyi*, p. 269
- bbb. Culms, three angled; spikelets 10-20 mm. long, 6-10 mm. thick. *S. paludosus*, p. 271
- aaa. Spikelets numerous, in clusters or single on pedicels, forming an umbel.
 - b. Spikelets large and thick, 15-40 mm. long.
 - c. Spikelets pale brown. *S. fluviatilis*, p. 271
 - cc. Scales of spikelets streaked with red (maritime). *S. robustus*, p. 270
 - bb. Spikelets small, not over 6 mm. long.
 - c. Culm terete, leaves reduced to sheaths on the culm. *S. validus*, p. 270
 - cc. Culm triangular.
 - d. Heads dense, star-shaped, spikelets blackish green. *S. atrovirens*, p. 271
 - dd. Umbel more open, spikelets often solitary or only 2 or 3 on a peduncle.
 - e. No hair-like bristles projecting from the scales. *S. lineatus*, p. 272
 - cc. With projecting hair-like bristles, giving the spikelets a downy appearance.
 - f. Spikelets blackish green, with a black band below the inflorescence. *S. longi*, p. 272
 - ff. Spikelets rusty brown.
 - g. Spikelets in clusters of 3-15. *S. cyperinus*, p. 272
 - gg. Spikelets on individual peduncles. *S. eriophorum*, p. 273

Scirpus nanus Spreng. Dwarf Club-rush.

Pl. XX., Fig. 3.

Scirpus nanus Sprengel, Pug. I. 4. 1813 [Saxony].—Britton 264.—Keller and Brown 64.

Elcocharis pygmaea Torrey, Ann. Lyc. N. Y. III. 313. 1836.—Willis 68.

Salt marshes on the coast. In Britton's list, as well as that of Keller and Brown, this species is said to be frequent, but I have not found it so, nor do there seem to be many specimens preserved from the State.

Fr.—Early July into September.

Maritime.—Pt. Pleasant, St. Albans (L), Ship Bottom (L), Beach Haven Terrace (L), Beesley's Pt. (H), Cold Spring.

Scirpus planifolius Muhl. Few-flowered Club-rush.

Pl. XX., Fig. 2.

Scirpus planifolius Muhlenberg, Gram. 32. 1817 [Pennsylvania and Delaware].
—Britton 264.—Keller and Brown 64.

In woods; frequent in the Northern and occasional southward in the Middle district.

Fr.—Late May to mid-June.

Middle District.—Mullica Hill (C), Mickleton, Swedesboro.

Scirpus subterminalis Torr. Water Club-rush.

Pl. XX., Fig. 6.

Scirpus subterminalis Torrey, Fl. U. S. I. 47. 1824 [Deerfield, Mass].—
Knieskern 34.—Torrey, Ann. Lyc. N. Y. III. 317.—Willis 68.—Britton
264.—Keller and Brown 64.

Common in Pine Barren streams, occurring locally also in the lower part of the Middle and Cape May districts.

A characteristic species in the dark brown waters of the Pine Barrens, where it grows in great masses, its long leaves and stems swaying in the current and often associated with *Eleocharis robbinsii*. In ponds where the water has been drained off, it often grows upright with much shorter and stiffer stems, presenting quite a different appearance.

Fr.—Early July to late August; fruit rather uncommon.

Middle District.—Repaupo (KB), Swedesboro, Fairton.

Pine Barrens.—Toms River, Ferrago (P), Bamber, Forked River, Waretown, Pasadena, West Creek (S), Tuckerton, Speedwell, Chatsworth (S), Browns Mills (KB), Cedar Brook (KB), Berlin, Jackson, Parkdale, Hamonton (NB), Quaker Bridge, west of Atlantic City, Pancoast.

Cape May.—Dennisville (S), Nummeytown.

Scirpus debilis Pursh. Weak-stalked Club-rush.

Pl. XX., Fig. 4.

Scirpus debilis Pursh, Fl. Am. Sept. 55. 1814 [Pennsylvania].—Barton, Fl. Phila. I. 36. 1818.—Willis 68.

Occasional in damp spots in the Northern and Middle districts. Rare within our limits.

Fl.—Late August into October.

Middle District.—Delanco, Birmingham, Mickleton (H).*

* The references to *S. debilis* by Harshberger, Proc. Ac. Nat. Sci., 1900, 623-671, must surely apply to *S. americanus*, as I have never found *S. debilis* growing as there described, nor do I know it from the coast.

Scirpus smithii Gray. Smith's Club-rush.

Scirpus Smithii A. Gray, Man. Ed. V. 563. 1867 [Lake Ontario to Illinois and Delaware Bay].—Willis 68.—Britton Trans. N. Y. Acad. Sci. XI. 78. 1892.—Britton 264.—Keller and Brown 65.

Damp open ground; along the Delaware river and very rare on the coast. Named in honor of Charles E. Smith (1820–1900), of Philadelphia, who brought it to Dr. Gray's attention. Mr. Smith was the leading authority on the plants of Philadelphia and vicinity. 1850–1870.*

Fr.—Late July into October.

Middle District.—Barrack Creek, Burlington, Delair, Fish House, Mouth of Cooper's Creek.

Coast Strip.—Sea Isle City (CDL).

Scirpus smithii setosus Fernald. Bristly Club-rush.

Scirpus smithii setosus Fernald Rhodora, Oct. 1901, p. 252 [Illinois].—Long, Rhodora, 1910, p. 155.

Rare; apparently confined to the Middle district.

Fr.—August 1, achenes mature and a few scales dropping.

Middle District.—Clementon.

Scirpus americanus Pers. Chair-maker's Rush. Three-square.

Pl. XX, Fig. 7.

Scirpus Americanus Persoon, Syn. I. 68. 1805 [South Carolina].—Barton, Fl. Phila. I. 34. 1818.

Scirpus pungens Knieskern 34.—Willis 68.—Britton 264.

Swamps and along the larger streams throughout the State, but most abundant along the coast marshes.

Fr.—Late June to early September.

Middle District.—Riverton, Camden, Medford (S), Beaver Dam.

Pine Barrens.—Quaker Bridge (S), Long Causeway (S), High Bridge (S), Landisville (T), Estelville, Mays Landing (NY).

Maritime.—Sandy Hook (NB), Ortley (NY), Seabright, Forked River, Surf City (L), Atlantic City, Ocean City (S), Stone Harbor, Piermont (S), Anglesea, Clermont (T), Cold Spring, Cape May (S), Dennisville, Sluice Creek (S).

Scirpus olneyi Gray. Olney's Bull-rush.

Pl. XX., Fig. 8.

Scirpus Olneyi Gray, Bost. Jour Nat. Hist. V. 238. 1845 [Salt Marshes, near Providence, R. I., and New Jersey].—Knieskern 34. Willis 68.—Britton 264.—Keller and Brown 65.

* Cf. National Magazine, 1893. 567.

Frequent with the preceding along the coast and on the Bay shore of the Cape May peninsula in shallow water bordering the salt marshes or tidewater creeks, northward to the Hackensack meadows.

Fr.—Late July to early September.

Maritime.—Squan (C), Toms River (C), Forked River, Manahawkin, Surf City (L), Barnegat City (L), Brant Beach (L), Capt May Ct. House (S), Cold Spring, Cape May Pt. (S), Dennis, Sluice Creek (S), Beaver Dam.

***Scirpus torreyi* Olney. Torrey's Bull-rush.**

Pl. XX, Fig. 5.

Scirpus Torreyi Olney, Proc. Providence Frank. Soc. I. 32. 1847 [near Providence, also West Point—Torrey].—Stone Proc. Acad. Nat. Sci. Phila. 1908, p. 458.

Found for the first time in the State on August 10, 1907, by the writer. It was growing along the edge of a shallow pond above Delanco near the Delaware River.

Fr.—Mid-July to mid-September.

Middle District.—Delanco.

***Scirpus validus* Vahl. Bull-rush.**

Pl. XX., Fig. 1.

Scirpus validus Vahl, Enum. II. 268. 1806 [Carabees and Jamaica].

Scirpus lacustris Barton I. 33. 1818.—Knieskern 34.—Britton 264.—Keller and Brown 65.

Frequent in open swamps or in shallow water, except in the Pine Barren district.

Fr.—Late June to early August.

Middle District.—New Egypt, Camden, Mickleton, Mullica Hill (NB), Lindenwold (S), Beaver Dam, Swedesboro.

Coast Strip.—Pt. Pleasant, Bayhead, Toms River, Forked River, Estelville, Piermont, Anglesea, Cold Spring.

Cape May.—Court House, Cape May (S), Cape May Pt. (S).

***Scirpus robustus* Pursh. Salt Marsh Bull-rush.**

Pl. XXI, Fig. 7.

Scirpus robustus Pursh, Fl. Am. Sept. 56. 1814 [Salt marshes and banks of rivers—probably N. J.].

Scirpus maritimus Knieskern 34.—Willis 68.—Keller and Brown 65.

Scirpus maritimus var. *macrostachyos* Britton 264.

Common all along the coast and up the bay shore, in salt marshes.

Fr.—Mid-July to early September.

Maritime.—Swimming River (NB), Deal, Spring Lake (NB), Asbury Park (S), Barnegat Pier, Seaside Park, Forked River, Beach Haven Terrace (L), Absecon, Atlantic City (S), Ocean City, Stone Harbor, Anglesea, Wildwood, Holly Beach, Cold Spring, Cape May, Cape May Pt., Green Creek, Dias Creek (S), Sluice Creek (S), So. Dennis.

***Scirpus robustus paludosus* (A. Nelson.). Pale Marsh Bull-rush.**

Scirpus paludosus A. Nelson, Bull. Torr. Club. XXVI. 5. 1899 [Granger, Wyo.].

With the preceding, but not common.

I am not satisfied that this is identical with Nelson's species, but until more material is available its status cannot be positively determined.

Maritime.—Deal, Seaside Park, Cold Spring (S).

***Scirpus fluviatilis* (Torr.). River Bull-rush.**

Pl. XXI. Fig. 8.

Scirpus maritimus var. *fluviatilis* Torrey, Ann. Lyc. N. Y. III. 324. 1836 [Western N. Y. and the Missouri above St. Louis].

Scirpus fluviatilis Britton 265.—Keller and Brown 65.

Scirpus macrostachyos Barton, Fl. Phila. I. 35. 1818.

Lower part of the Middle district along the Delaware River.

Fr.—Early July to early September; flowering culms apparently quite rare, or frequently only at certain stations.

Middle District.—Pensauken, Cooper's Creek, Mickleton = Old Mans Creek, Swedesboro.

***Scirpus atrovirens* Muhl. Dark-green Bull-rush.**

Pl. XX., Fig. 9.

Scirpus atrovirens "Muhlenberg," Willdenow Enum. Hort. Berol. 79. 1809 [North America].—?Barton Fl. Phila. I. 35. 1818.—Torrey Ann. Lyc. N. Y. III. 326. 1836.—Britton 265.—Keller and Brown 65.

Common in wet meadows in the Northern, and southward in the Middle district. Rare and probably introduced in the Pine Barrens. Specimens from Yorktown and Winslow seem to represent the form *S. georgianus* of R. M. Harper.

Fr.—Late June to early August.

Middle District.—Freehold (NB), Browns Mills (KB), Wolferts Sta. (H). Swedesboro.

Cape May.—Cape May (OHB), Cape May Pt. (OHB).

***Scirpus lineatus* Michx. Reddish Bull-rush.**

Pl. XX., Fig. 10.

Scirpus lineatus Michaux, Fl. Bor. Amer. I. 32. 1803 [Carolina].—Pursh, Fl. Am Sept. I. 56. 1814.—Long, Bartonica II. 19. 1910.

Open wet ground; rare; Northern, Middle and Pine Barren districts.

Fr.—Achenes mature and immediately drop with their scales in regular sequence from mid-June to mid-July.

Middle District.—New Egypt.

Pine Barrens.—Winslow Jnc.

***Scirpus longii* Fernald. Long's Wool-grass.**

Pl. XX., Fig. 11.

Scirpus Longii Fernald, Rhodora Jan., 1911. 6 [Andrew's, Camden Co., N. J.].

Discovered by the writer in a Pine Barren swamp about two miles north of Speedwell July 9, 1900. Local and restricted to the Pine Barrens, usually growing in water and blooming much earlier than the closely allied *S. atrovinctus* in the Pennsylvania Alleghanies. Named for Mr. Bayard Long, who has made a critical study of the Philadelphia flora for several years past and has rendered valuable assistance in the preparation of the present volume.

Fr.—Achenes mature and soon drop with their scales in regular sequence from mid-June to mid-July.

Pine Barrens.—Two miles north of Speedwell, Andrews, Sicklerville, Winslow Jnc.

***Scirpus cyperinus* (L.). Wool-grass.**

Pl. XX., Fig. 13.

Eriophorum cyperinum Linnaeus, Sp. Pl. Ed. II. 77. 1762 [North America].—Britton 265.

Scirpus Eriophorum Willis 68.

Frequent in swamps throughout the State, but less abundant than the following within our limits, especially in the Pine Barrens and Coast district.

Fr.—Mid-July into October.

Middle District.—Delanco, Mt. Holly, Clementon.

Coast Strip.—Barnegat City (L), Surf City (L), Beach Haven Terrace (L), Manahawkin.

Pine Barrens.—Folsom, Kenilworth (S).

***Scirpus eriophorum* Michx. Pedicelled Wool-grass.**

Pl. XX., Fig. 12.

Scirpus Eriophorum Michaux, Fl. Bor. Am. I. 33. 1803 [Virginia to Georgia].—Knieskern 34.—

Scirpus Eriophorum var. *laxus* Willis 68.—Britton 265.

Swamps throughout the State, especially abundant in the Pine Barrens and along the Coastal strip.

Fr.—Mid-August into October; maturing distinctly later than the preceding.

Middle District.—Washington Park (S), Lindenwold (S), Millville.

Pine Barrens.—Penbryn (S), Malaga (S), Hammonton (S), Bamber Folsom.

Coast Strip.—Surf City (L), Anglesea, Atlantic City (S), Absecon (S), Ocean City (S), Forked River, Cox's.

ERIOPHORUM L.

Key to the Species.

a. Leaves very slender, 1–1.5 mm. broad, triangular-channelled, a single involucre bract, pappus pure white.

b. Upper cauline leaf with blade very short, less than sheath.

E. gracile, p. 274

bb. Upper cauline leaf with blade longer than sheath. *E. tenellum*, p. 273

aa. Leaves flat, involucre bracts, two or more, pappus more or less rusty.

E. virginicum, p. 274

***Eriophorum tenellum* Nutt. Few-nerved Cotton-grass.**

Pl. XIX., Fig. 5.

Eriophorum tenellum Nuttall, Gen. Additions (p. 1), 1818 [New Jersey].

Eriophorum angustifolium Barton, Fl. Phila. I. 37. 1818.

Eriophorum polystachyon Knieskern 34.—Willis 68.—Britton 265.

Eriophorum gracile Keller and Brown 66.

In bogs of the Pine Barren district, also very rare or local in similar situations in west Jersey and the Cape May peninsula. As all the specimens so far obtained in our region are *E. tenellum* (except one colony of *E. gracile*), I am inclined to think that Dr. Knieskern's were the same and not *E. polystachyon*, as he stated. Willis and Britton simply copied his record.

Fr.—Early June to late June.

Middle District.—Swedesboro.

Pine Barrens.—Jackson, Speedwell (S), Tuckerton (KB), Estelville.

Cape May.—Cold Spring.

Eriophorum gracile Koch. Slender Cotton-grass.

Eriophorum gracile Koch, Roth. Cabal. Bot. 2. 259. 1800 [Kaiserlantern Palatinatu].

Very rare within our limits, but probably more common northward. Mr. Benjamin Heritage discovered this species June 10, 1892, in the bog at Repaupo, where so many other northern plants occur.

Fr.—Early May to late May.

Middle District.—Seven miles west of Mickleton [Repaupo].

Eriophorum virginicum L. Virginia Cotton-grass.

Pl. XIX., Fig. 1.

Eriophorum virginicum Linnæus, Sp. Pl. 52. 1753 [Virginia].—Knieskern 34.—Willis 68.—Britton 265.

Common in bogs throughout the State, especially abundant in the Pine Barrens, where its tufts of white "cotton" on their long slender stems are a conspicuous feature in the autumn.

Fr.—Mid-August to late September.

Middle District.—Haddonfield, Lindenwold, Clementon, Mickleton, Swedesboro.

Pine Barrens.—Brindletown, Hanover, Forked River, West Creek (S), Absecon, Bear Swamp, Albion, Cedar Brook, Williamstown Jnc., Landisville, Pleasant Mills (S), Forks of Batsto, Eighth St. (T), Egg Harbor, Manumuskin (S).

Cape May.—Cold Spring (S).

FUIRENA Rottboell.

Key to the Species.

- | | |
|---------------------------------------|------------------------------|
| a. Leaves and upper sheaths glabrous. | <i>F. squarrosa</i> , p. 274 |
| aa. Leaves and sheaths hirsute. | <i>F. hispida</i> , p. 275 |

Fuirena squarrosa Michx. Smooth Fuirena.

Fuirena squarrosa Michaux, Fl. Bor. Am. I. 37. 1803 [Georgia and Carolina].—Pursh, Fl. Am. I. 58. 1814.—Barton, Fl. Phila. I. 37. 1818.—Britton 266.—Keller and Brown 66.

Fuirena squarrosa var. *pumila* Knieskern 34.—Willis 67.

Salt marshes on the coast, apparently less common than the next.

Fr.—Late August to early October.

Maritime.—Spring Lake (NY), Spray Beach (L), N. Beach Haven (L), Absecon, Ocean City, Palermo (S), Mays Landing (NY), Anglesea, Cape May, Cape May Pt.

Fuirena hispida Ell. Bristly Fuirena.

Pl. XIX., Fig. 4.

Fuirena hispida Elliot, Bot. S. C. and Ga. I. 579. 1821 [Milledgeville, Ga.].

Fuirena squarrosa Knieskern 34.—Muhlenberg, Gram. 50. 1817.—Willis 67.

Fuirena squarrosa var. *hispida* Britton 266.—Keller and Brown 66.

Frequent along the edge of the salt marshes.

Fr.—Early August to early October.

Maritime.—Bay Head (S), Forked River (S), Ocean View, Cold Spring, Cape May (NB), Dias Creek.

RYNCHOSPORA Vahl.

Key to the Species.

- a. Spikelets spindled-shaped, 25 mm. long, in an open compound umbel plant, 9-21 dm. tall.
 - b. Spikelets sessile on a few short rays. *R. macrostachya*, p. 276
 - bb. Spikelets scattered, rays long and flexuous. *R. m. inundata*, p. 276
- aa. Spikelets 1-4; 6-8 mm. long, terminal, plant 1.5-4 dm. tall.
 - R. oligantha*, p. 277
- aaa. Spikelets numerous in dense axillary or terminal clusters.
 - b. Clusters corymbose.
 - c. Spikelets white or whitish.
 - d. No bristles at base of achene. *R. pallida*, p. 278
 - dd. Bristles present. *R. alba*, p. 277
 - cc. Spikelets chestnut or brown.
 - d. Spikelets 2 mm. long. *R. knieskernii*, p. 278
 - dd. Spikelets 4-5 mm. long.
 - e. Spikelets 5 mm. long, plants seldom over 3 dm. in height. *R. fusca*, p. 280
 - ee. Spikelets 3-4 mm. long, plants 3-9 dm. high.
 - f. Bristles of achene upwardly barbed.
 - g. Leaves filiform, involute. *R. filifolia*, p. 279
 - gg. Leaves flat grass-like.
 - h. Plant very slender, spikelets usually few in an umbel. *R. gracilentia*, p. 277
 - hh. Plant more robust with larger, numerous-flowered umbels. *R. smallii*, p. 279
 - ff. Bristles of achene downwardly barbed.
 - Plant slender, leaves slender. *R. glomerata leptocarpa*, p. 279

hh. Plant more robust, leaves wider.

R. glomerata, p. 279

bb. Clusters in dense globular heads, spikelets brown.

c. Clusters 15–25 mm. in diameter.

R. axillaris, p. 280

cc. Clusters 7–15 mm. in diameter.

R. a. microcephala, p. 280

aaaa. Spikelets pedicelled or clusters pedicelled in a more or less open panicle.

b. Leaves filiform, spikelets on filiform pedicels. *R. rariflora*, p. 281

bb. Leaves involute, spikes sessile.

R. torreyana, p. 281

bbb. Leaves flat, spikelets sessile.

R. cymosa, p. 281

***Rynchospora macrostachya* Torr. Horned Rush.**

Pl. XVIII., Fig. 1.

Rynchospora macrostachya Torrey, Gray Ann. Lyc. N. Y. III. 206. 1835.

[Amherst and New Bedford, Mass.]. Willis 69.

Ceratoschoenus macrostachya Knieskern 34.—Gray Man. Ed. I. 532. 1848.

Rynchospora laxa var. *macrostachya* Britton 268.

Rynchospora corniculata macrostachya Keller and Brown 67.

Rynchospora corniculata Keller and Brown 67.

Locally common in swampy ground along the lower Delaware River; more plentiful in the Cape May peninsula and casual in the Pine Barrens, usually near the coast.

C. corniculata, reported by Keller and Brown from Center Square, proves to be this species.

This is a giant among our other *Rynchosporas*, and with its large clusters of long spikelets recalls some of the larger species of *Cyperus*, although it is taller even than they are.

Fr.—Mid-August to late September.

Middle District.—Center Square, Berlin, Pennsgrove (C), Franklinville (P).

Pine Barrens.—Manchester (C), Forked River (S), Mays Landing (T), Eighth St.

Cape May.—Bennett, Cold Spring, Green Creek, Cape May.

***Rynchospora macrostachya inundata* (Oakes.). Slender Horned Rush.**

Ceratoschoenus macrostachys inundata Oakes, Harvey's Magazine VII. 1841.

185 [West Pond, Plymouth, Mass.].

Less common, but range probably the same as the last.

Fr.—Mid-August to late September.

Middle District.—Swedesboro, Repaupo.

Pine Barrens.—Pasadena, Manchester (P).

***Rhynchospora gracilentia* Gray. Slender Beaked-rush.**

Rhynchospora gracilentia Gray, Ann. Lyc. N. Y. III. 216. 1835 [Pine Barrens of N. J.].—Knieskern 34.—Willis 69.—Britton Tran. N. Y. Acad. Sci. XI. 90. 1892.—Britton 267.—Keller and Brown 68.

Frequent in swamps or bogs in the Pine Barrens and Cape May districts, here reaching the northern limit of its range.

Fr.—Mid-July to early September.

Pine Barrens.—Lakehurst, Toms River, Forked River, Bamber Absecon, Quaker Bridge, Speedwell (S), Atsion, Parkdale (S), Landisville, Eighth St., Hammonton, Egg Harbor City, Dividing Creek.

Cape May.—Bennett, Whitesboro (S), Cold Spring (S), Green Creek (S).*

***Rhynchospora oligantha* Gray. Few-flowered Beaked-rush.**

Pl. XVIII., Fig. 9.

Rhynchospora oligantha Gray, Ann. N. Y. Lyc. III. 212. 1835 [Fayetteville and Wilmington, N. C.].—Stone, Proc. Acad. Nat. Sci. Phila., 1908, p. 458.

Known only from bogs along the Wading River above Speedwell in the heart of the Pine Barrens, where it was first found by Mr. S. S. Van Pelt June 29, 1906. Not previously known north of Delaware. In July, 1909, Mr. Van Pelt and the writer found a patch of this sedge probably half an acre in extent.

Fr.—Late June to mid-August.

Pine Barrens.—Between Speedwell and Chatsworth.

***Rhynchospora alba* (L.). White Beaked-rush.**

Pl. XVIII., Fig. 10 (lower).

Schoenus albus Linnæus Sp. Pl. 44. 1753 [N. Europe].

Rhynchospora alba Barton Fl. Phila. I. 25. 1818.—Knieskern 35.—Willis 69.—Britton 267.

Common in bogs of the Pine Barren and Cape May districts, and casually in the Middle district.

Fr.—Early August to mid-September.

Middle District.—Tomlin, Swedesboro.

Pine Barrens.—Allaire, Lakehurst, Island Hts. Inc., Forked River, Waretown, West Creek (S), Speedwell (S), Forks of Batsto, Parkdale, Berlin, Pen Bryn (S), Landisville (T), Egg Harbor City (S), Palermo, eight m. W. Atlantic City.

Coast Strip.—Sherburn's (L.).

Cape May.—Cold Spring (S).

* The record for Mickleton (KB), Heritage, proves to be a depauperate *R. glomerata*.

Rhynchospora pallida M. A. Curtis. **Pale Beaked-rush.**

Pl. XVIII., Fig. 10 (upper).

Rhynchospora pallida M. A. Curtis, Am. Jour. Sci. (II.) 7. 409. 1849 [Wilmington, N. C.].—Willis 69.—Gray Man. Ed. V. 568. 1867.—Britton Trans. N. Y. Acad. Sci. XI. 87. 1892.—Britton 267.—Keller and Brown 67.

Common in bogs of the Pine Barren, Cape May and locally in the lower Middle districts. It does not range north of the New Jersey Pines.

Fr.—Mid-July to early September.

Middle District.—New Egypt, Bordentown, Merchantville, Woodbury, Lindenwold, Dividing Creek.

Pine Barrens.—Lakehurst, Manchester, Forked River, Toms River, Browns Mills (P), Chatsworth, Bear Swamp, Clementon, Atsion, Parkdale, Quaker Bridge, Landisville, Buena Vista (T), Batsto (P), Hammonton (S), Egg Harbor City.

Cape May.—Court House.

Rhynchospora knieskernii Carey. **Knieskern's Beaked-rush.**

Pl. XVIII., Fig. 2.

Rhynchospora Knieskernii Carey, Am. Jour. Sci. (II.) 4. 25. 1847 [Pines of New Jersey].—Knieskern 35.—Willis 69.—Britton Trans. N. Y. Acad. Sci. XI. 88. 1892.—Britton 267.—Keller and Brown 67.

Confined to the Pine Barren region, where it is said to always occur on deposits of bog iron; rare.

Remarkably fine specimens were obtained by Mr. C. A. Gross, which measured 6 dm. in height.

The species was first discovered by Dr. Knieskern, after whom it was named, at Point Hollow, two miles from Manchester (now Lakehurst), on the road to Cassville, where the doctor resided. Knieskern was one of the pioneer botanists of the Pine Barrens, and his name appears frequently in Gray's Manual—His Catalogue of Plants of Monmouth and Ocean Cos. 1856, was the first publication dealing directly with the flora of the Pines.

Fr.—Late July to late September.

Pine Barrens.—Hope Village on Shark River (P), Cassville, Bamber, Whitings, West Creek (S), Pleasant Mills, Atsion, Egg Harbor City, Quaker Bridge (C).

Original specimens at the New York Botanical Garden are labelled by Knieskern "*R. Grayana* Kn. (NSp)," a name that was apparently never published.

Rhynchospora glomerata (L.). Clustered Beaked-rush.

Pl. XVIII., Fig. 7.

Schoenus glomeratus Linnaeus, Sp. Pl. 44. 1753 [Virginia].*Rhynchospora glomerata* Knieskern 35.—Willis 69.—Britton 267.—Keller and Brown 67.

Open wet ground, bogs, etc.; frequent throughout the State, and abundant in the Pine Barrens. The most common species of the genus.

Fr.—Late July to late September.*Middle District.*—New Egypt, Lindenwold, Tomlin, Swedesboro, Salem (S), Dividing Creek.*Pine Barrens.*—Lakehurst, Waretown, Atsion, Weymouth (T), Clementon, Landisville, Woodbine.*Coast Strip.*—Pt. Pleasant, Seaside Park, Barnegat City (L), St. Albans (L), Sherburn's (L), N. Beach Haven (L), West Creek (S), Ocean City (S).*Cape May.*—Cape May (S).**Rhynchospora glomerata leptocarpa Chapm.***Rhynchospora glomerata leptocarpa* Chapman, Britton, Trans. N. Y. Acad. Sci. II. 88. 1892 [So. Carolina].

Apparently rather frequent in the heart of the Pine Barrens. This is a more slender form with narrower leaves, perhaps identical with *minor* of Britton. The variety *discutiens** of Clarke is reported from New Jersey, but I have not found it.

Fr.—Early August to mid-September.*Pine Barrens.*—Jones Mill (S), Batsto, four mi. E. Hammonton (S), Manumuskin, Franklinville (P).**Rhynchospora smallii Britton. Small's Beaked-rush.***Rhynchospora Smallii* Britton in Small's Southern Flora, p. 1321 [Hendersonville to Solola Mt.].—Long, Bartonía II. 19. 1910.

Occasional and perhaps more abundant than it at present appears to be. Its close resemblance to *R. glomerata* makes it difficult to recognize.

Fr.—Late July to mid-September.*Middle District.*—Delanco.*Pine Barrens.*—Parkdale.**Rhynchospora filifolia Torrey. Thread-leaved Beaked-rush.***Rhynchospora filifolia* Torrey Ann. Lyc. N. Y. III. 1836. 366 [N. Carolina and Florida].

* Britton's Manual, p. 185.

Apparently very rare, and known only from swamps along the railroad northwest of Woodbine, Cape May County, where it was collected by Mr. Stewardson Brown August 30, 1900, and from Bennett, Cape May County, B. Long, August 11, 1911.

Not previously known from New Jersey.

Fr.—August 30 achenes mature; some scales gone.

Pine Barrens.—Woodbine.

Cape May.—Bennett.

***Rynchospora axillaris* (Lam.). Capitate Beaked-rush.**

Pl. XVIII., Fig. 8.

Schoenus axillaris Lamarck, Tabl. Encycl. I. 137. 1791.

Rynchospora cephalantha Knieskern 35.—Willis 69.—Gray Ann. Lyc. N. Y. III. 218. 1835.

Rynchospora axillaris Britton 267.—Keller and Brown 67.

Bogs in the Pine Barrens; rare. First found in the State by Dr. Torrey.

Fr.—Late July to mid-September.

Pine Barrens.—Manchester (C), Bamber, Chatsworth, Jones Mill (S), Speedwell, Quaker Bridge, Atsion (P), Parkdale, Hammonton, Batsto (P), Egg Harbor City (P).

***Rynchospora avillaris microcephala* Britton. Small-headed Beaked-rush.**

Rynchospora axillaris var. *microcephala* Britton Trans. N. Y. Acad. Sci. XI. 89. 1892 [Monmouth Co., N. J.].

Pine Barren bogs; rare. Dr. Britton described this form from one of Dr. Knieskern's specimens, the latter apparently not distinguishing it from the last.

Fr.—Late July to mid-September.

Pine Barrens.—Speedwell, Parkdale.

***Rynchospora fusca* (L.). Brown Beaked-rush.**

Pl. XVIII., Fig. 6.

Schoenus fuscus Linnæus Sp. Pl. Ed. 2. 1664. 1763 [Switzerland, England and Italy].

Rhynchospora fusca Knieskern 34.—Willis 69.—Gray Ann. Lyc. N. Y. III. 215. 1835.—Britton 267.—Keller and Brown 68.

Bogs of the Pine Barren and Cape May districts frequent.

Fr.—Late June to early September.

Middle District.—New Egypt.

Pine Barrens.—Lakehurst, Manchester (C), Forked River, Toms River, Bamber, Mayetta, Manumuskin, Chatsworth, Speedwell (S), Quaker Bridge (C), Absecon, Cedar Lake, Spring Garden (P), Eighth St., Vineland, Landisville (T), Pancoast, Egg Harbor City, Belleplain (S).

Cape May.—Bennett.*

***Rhynchospora cymosa* Ell. Grass-like Beaked-rush.**

Pl. XVIII., Fig. 3.

Rhynchospora cymosa Elliott, Bot. Sc. and Ga. I. 58. 1816 [South Carolina].

—Knieskern 34.—Gray Ann. Lyc. N. Y. III. 196. 1835.—Willis 69.—Britton 266.—Keller and Brown 68.

Bogs of the Northern, Middle, and Cape May districts, and also on the Coast Strip; not very common.

Fr.—Early July to mid-August.

Middle District.—Griffith's Swp. (P) Lindenwold, Mickleton (H).

Coast Strip.—Squan (C), Manahawkin.

Cape May.—Bennett, Cold Spring.

***Rhynchospora torreyana* Gray. Torrey's Beaked-rush.**

Pl. XVIII., Fig. 5.

Rhynchospora Torreyana Gray Ann. Lyc. N. Y. III. 197. 1835 [Monmouth

Co. and Quaker Bridge, N. J.].—Knieskern 34.—Willis 69.—Britton 266.—Keller and Brown 68.

Bogs of the Pine Barren and Cape May districts rather frequent. This takes the place of *R. cymosa* in the Pines, but at Cold Spring, Cape May County, I have found the two growing in close proximity.

Fr.—Mid-July to early September.

Middle District.—New Egypt.

Pine Barrens.—Quaker Bridge (C), Pleasant Mills (C), Batsto, White Horse (S), Parkdale, Atsion, Main Road Sta., Egg Harbor City.

Cape May.—Anglesea Inc., Rio Grande, Bennett, Cold Spring, Nummeytown (S).

***Rhynchospora rariflora* Michx. Rare-flowering Beaked-rush.**

Pl. XVIII., Fig. 4.

Schoenus rariflora Michx., Fl. Bor. Am. I. 35. 1803 [Georgia].—Stone, Torrey. 1908. 16.

* The record for Mickleton (C) has not been verified.

Discovered by the writer in a bog near Bennett, Cape May County, August 4, 1907. Previously not known from north of North Carolina.

Fr.—Probably July. Later specimens show few intact panicles.

Cape May.—Bennett.

CLADIUM P. Browne.

Cladium mariscoides (Muhl.). **Twig Rush.**

Pl. XIX., Fig. 2.

Schoenus mariscoides Muhlenberg, Gram. 4. 1817 [Pennsylvania].

Cladium mariscoides Knieskern 35.—Torrey, Am. Lyc. N. Y. III. 372. 1836.

—Willis 69.—Britton 268.—Keller and Brown 68.

Common in wet bogs or marshes in the Northern, Pine Barren, Coast and Cape May districts.

Fr.—Mid-July into October.

Pine Barrens.—Toms River, Forked River (NB), Bamber, Speedwell, Chatsworth, Berlin, White Horse (S), Cedar Brook, Main Road Sta. (T), Eighth St. (T), Parkdale, Batsto, Quaker Bridge (NB), Egg Harbor City, Estelville, Dennisville (P).

Coast Strip.—Pt. Pleasant, Spray Beach (L), Beach Haven Terrace (L), opposite Ocean City, Ocean View.

Cape May.—Cold Spring, Bennett (S), Cape May (S).

SCLERIA Berg.

Key to the Species.

- a. Spikelets in a terminal, or a terminal and 1-3 smaller lateral stalked clusters.
 - b. Achene smooth and shining.
 - c. 2 mm. high. Plant 4.5-9 dm. tall. *S. triglomerata*, p. 282
 - cc. 1 mm. high. Plant more delicate, 3-6 dm. tall. *S. minor*, p. 283
 - bb. Achene irregularly reticulate.
 - c. Lobes of hypogynium emarginate or cleft, somewhat obtuse, achene 1-1.5 mm. *S. reticularis*, p. 283
 - cc. Lobes acute or acuminate, achene 2-2.5 mm., plant taller and more lax. *S. r. torreyana*, p. 283
 - bbb. Achene papillose. *S. pauciflora*, p. 284
- aa. Spikelets in several, separate, sessile, somewhat whorled clusters. *S. verticillata*, p. 284

Scleria triglomerata Michx. Nut-rush.

Pl. XIX., Fig. 6.

Scleria triglomerata Michaux, Fl. Bor. Am. II. 168. 1803 [Carolina].—Knieskern 35.—Willis 69.—Britton 268.—Keller and Brown 68.

Common in bogs and wet places in the Pine Barren, and locally in the Northern and Middle districts.

Fr.—Early July to early September.

Middle District.—Griffith's Swamp, Lindenwold (S), Gloucester, Tomlin, Yorktown, Dividing Creek.

Pine Barrens.—Browns Mills, West Creek (S), Tuckerton, Chatsworth, Speedwell (S), Jones Mill (S), White Horse (S), Bear Swamp (S), Clementon, Waterford, Penbryn (S), Sicklerville (S), Winslow, Landisville, Parkdale (S), Egg Harbor City, Quaker Bridge (NY).

Coast Strip.—Atlantic City (possibly from the mainland, opposite).

***Scleria minor* (Britt.). Slender Nut-rush.**

Scleria triglomerata minor Britton Ill. Flora I. 282. [So. N. J.] (new name for *S. f. gracilis* Br.).

Scleria triglomerata var. *gracilis* Britton Ann. N. Y. Acad. III. 230. 1883 [Leeds Pt., Haddonfield, Quaker Br.].—Britton 268.

Apparently restricted to the swamps of the Pine Barrens and locally in the Cape May district and in Long Island.

Fr.—Late June to late August.

Middle District.—Griffith's Swamp (NB), Dividing Creek.

Pine Barrens.—Forked River, Bamber, Pasadena, Manahawkin, Chatsworth, Speedwell (S), Quaker Bridge (Britton), Buena Vista (T), Main Road Sta. (T), Landisville, Hammonton, Leeds Pt. (Britton).

Cape May.—Bennett, Whitesboro (S).

***Scleria reticularis* Michx. Reticulated Nut-rush.**

Scleria reticularis Michaux Fl. Bor. Am. II. 167. 1803 [Carolina].—Pursh, Fl. Am. Sept. I. 45. 1814.—Gray Man. Ed. I. 534. 1848.

Only known from the Cape May district; apparently quite rare. Most of the records of this species in our region refer to the next.

Fr.—Early August to mid-September.

Cape May.—Bennett.

***Scleria reticularis torreyana* (Walp.). Torrey's Nut-rush.**

Pl. XIX., Fig. 7.

Scleria Torreyana Walp, Ann. III. 696. 1852-3 [New Jersey, Long Island] (new name for *S. laxa* Torr., Gray Man. 534).—Britton 268.—Keller and Brown 69.

Scleria laxa Torrey Ann. Lyc. N. Y. III. 443. 1836.—Knieskern 35.—Willis 69.

Scleria reticularis pubescens Keller and Brown 69.

Scleria reticularis Gross, Bull. Torr. Bot. Club XI. 32. 1884.—Britton 268.—Keller and Brown 68.

Pine Barren and Cape May districts locally common. The width of the leaves and pubescence of the achenes are characters which are very variable. The several varieties of Dr. Britton I cannot distinguish, as they seem to be merely individual variations, without satisfactory correlation of characters.

Fl.—Early August into September.

Pine Barrens.—Manchester (C), Toms River (P), Forked River (S), Coxe's, Speedwell, Chatsworth, Quaker Bridge, Batsto (P), Palermo (S).

Cape May.—Cold Spring.

***Scleria pauciflora* Muhl. Papillose Nut-rush.**

Scleria pauciflora "Muhl." Willdenow, Sp. Pl. IV. 318. 1805 [probably Pennsylvania. Willd. cites Carolina, but this is taken from Michaux whose *S. oligantha* is erroneously cited as a synonym].—Knieskern 35.—Wills 69.—Britton 268.

Dry ground, Middle district not common; also rare and local in the Pine Barrens, where it has, perhaps, been introduced, and at stations in Warren County.

Fr.—Early July to early September.

Middle District.—Allaire (S), Shark River, Clementon, Mickleton (H), Fairview (H), Hammonton.

Pine Barrens.—Da Costa, Buena Vista (T), (near Landisville, which is the locality quoted by Britton), Whitings (H).

Cape May.—Bennett.

***Scleria verticillata* Muhl. Whorled Nut-rush.**

Pl. XIX., Fig. 3.

Scleria verticillata "Muhl.," Willdenow Sp. Pl. IV. 317. 1805 [Virginia and Carolina].

Common along the edge of the salt marshes of the coast of Cape May County (probably further north also). It was first collected here by Mr. C. S. Williamson, at Cold Spring. Dr. Britton's list has it only from the Hackensack marshes.

Fr.—Early August to mid-September (possibly).

Coast Strip.—Palermo, opp. Ocean City, opp. Anglesea, Cold Spring, W. Cape May (OHB).

CAREX L.

The genus *Carex* is represented by but few species in the Pine Barrens, but in other parts of our region a number of species occur. Some of northern affinities barely enter our limits, while others are widespread.

Flowering and Fruiting Data.—Time of year noted indicates the season during which characteristic, fully developed perigynia, generally with mature achenes, are present, and intact spikes occur—satisfactory study of the genus can only be undertaken at this season.

Key to the Species.

- a. Staminate and pistillate spikes clearly distinct, although they may be closely contiguous.
 - b. Staminate spike long-stalked, so that it stands entirely clear of the adjacent pistillate spike even when the latter is appressed to the stalk.
 - c. Staminate spike single.
 - d. Pistillate spikes large, at least 12 mm. in diameter.
 - e. Sessile and nearly globular, several close together, green.
 - C. intumescens*, p. 291
 - ee. Peduncled, cylindrical, 25 mm. or more long, lowest spike often drooping on a very slender peduncle.
 - C. hystericina*, p. 293
 - dd. Pistillate spikes medium, 8 mm. in diameter, plant glaucous.
 - C. livida*, p. 303
 - ddd. Pistillate spikes, small, less than 6 mm. in diameter.
 - e. Tall, upright flower stalks nearly or quite equaling the leaves or exceeding them.
 - f. Leaves broad, many of them, 6 mm. broad or more, glaucous, lower pistillate spikes on long flexuous peduncles six times their length.
 - C. laxiculmis*, p. 302
 - ff. Leaves narrow, 4 mm. broad or less.
 - g. Beak of perigynia elongated and twisted to one side, lower pistillate spikes on long flexuous peduncles.
 - C. styloflexa*, p. 302
 - gg. Beak not produced or twisted, very short.
 - h. Staminate spike with peduncle, 75–100 long.
 - C. tetanica*, p. 301
 - hh. Staminate spike with peduncle, 25–50 mm. long or less.
 - i. Pistillate spikes, 3 mm. in diameter, lowest on filiform peduncles, achenes sharply 3-angled.
 - C. digitalis*, p. 302
 - ii. Pistillate spikes, 5 mm. in diameter, none slender peduncles, achenes not sharply 3-angled.
 - C. conoidea*, p. 301

- ee.* Achenes ellipsoid ovoid, angles not prominently knobbed.
C. lupulina, p. 292
- ddd.* Swollen at base tapering to a slender beak.
 - e.* Spikes erect or somewhat pendant, but achenes and scales never reflexed, $25-65 \times 20$ mm. *C. lurida*, p. 293
 - ee.* Spikes all pendant and scales and achenes reflexed, $35-50 \times 12$ mm. *C. comosa*, p. 293
- cc.* Achenes 5 mm. long or less.
 - d.* Stems scabrous, achenes long beaked, often partly reflexed.
C. scabrata, p. 295
 - dd.* Stems not scabrous.
 - e.* Achenes reflexed, staminate spike strictly sessile, oblique from base of upper pistillate spike, the latter yellow.
C. flava, p. 300
 - ce.* Achenes not reflexed.
 - f.* Spikes pendant.
 - g.* Pistillate spike 50 mm. long or more, 12 mm. thick, achenes plano-convex.
 - h.* Leaf sheaths glabrous. *C. crinita*, p. 298
 - hh.* Leaf sheaths scabrous hispid.
C. gynandra, p. 298
 - gg.* Pistillate spikes 25-50 mm. long, 5-6 mm. thick.
 - h.* Scales largely deep purplish black, spikes 25 mm. long. *C. barrattii*, p. 297
 - hh.* Scales brown or purplish, spike 16 mm. long.
C. limosa, p. 297
 - hhh.* Scales green or brownish, spikes very slender, tip of staminate spike often pistillate, all spikes filiform peduncled.
 - i.* Achenes short. *C. prasina*, p. 297
 - ii.* Achenes long and slender.
 - j.* Achene twice as long as the scale.
C. tenuis, p. 299
 - jj.* Achene three times as long as the scale.
C. oblita, p. 299
 - ff.* Spikes erect.
 - g.* Achenes densely pubescent, pistillate spikes one or two close to the staminate spike. *C. vestita*, p. 295
 - gg.* Achenes glabrous.
 - h.* Pistillate spikes 2-3 close to the staminate spike (none half way down the stalk), spikes thick, and short 12×5 mm. *C. pallescens*, p. 301
 - hh.* Pistillate spikes somewhat remote, one always well below the others.
 - i.* Perigynia ovoid, beakless.
 - j.* Plant densely glaucous.
C. glaucodea, p. 300
 - jj.* Plant green, not glaucous.
C. grisea, p. 300

- ii. Perigynia with short beak, twisted to one side, ribbed.
 - j. Pistillate spikes dense, closely imbricated. *C. granularis*, p. 300
 - jj. Pistillate spikes, rather loosely flowered, especially below, not closely imbricated.
 - k. Leaves 3-7 mm. wide, spikes and perigynia short, latter 2.5-4 mm. *C. laxiflora*, p. 301
 - kk. Leaves 6-20 mm. wide, spikes and perigynia long, latter 2-2.5 mm. *C. l. patulifolia*, p. 302
 - hhh. Pistillate spikes forming 1-3 small clusters at the base of the sessile staminate spike. Entire inflorescence occupying less than one inch of the top of the stem.
 - i. Perigynia densely wooly, beaked; beak long and flat.
 - j. Plant stoloniferous, the elongated, often leafless stolons scaly and creeping, inflorescence purplish. *C. pennsylvanica*, p. 303
 - jj. Plant caespitose not stoloniferous, inflorescence greenish. *C. varia emmonsii*, p. 304
 - ii. Perigynia glabrous, ellipsoid, not beaked. *C. leptalea harperi*, p. 305
- bbb. Inflorescence much exceeded by the leaves, but not sessile.
 - c. Scales more or less dark purple margined.
 - d. Inflorescence all at the summit of the stalk, pistillate and staminate spikes closely associated. *C. nigromarginata*, p. 305
 - dd. Inflorescence in several rather remote heads. *C. pedunculata*, p. 303
 - cc. Scales green.
 - d. Staminate spike at tip of pistillate, the latter of only 3-9 achenes. *C. willdenovii*, p. 305
 - dd. Staminate spike at base of pistillate, the latter of typical form, many flowered. *C. abscondita*, p. 303
- aa. Staminate and pistillate flowers mingled in the same spike, sometimes occupying different parts of it.
 - b. Spike regular cylindrical.
 - c. Staminate portion terminal.
 - d. Spikes 7-50 mm. long, always dark brown, more or less variegated, perigynia white, beakless. *C. burbaumii*, p. 296
 - dd. Spikes green, scales whitish 4-16 mm. long. *C. l. harperi*, p. 305
 - cc. Staminate portion basal, persisting as a sheath of imbricated scales, embracing the base of the spike.
 - d. Perigynia not reflexed.
 - c. Spikes 12 mm. thick.

- f. 15 mm. long, pistillate scales sharp pointed.
C. squarrosa, p. 294
- ff. 25 mm. long, pistillate scales blunt.
C. typhinoides, p. 294
- ee. Spikes 6 mm. thick or less.
 - f. Spikes three-clustered at the top of the culm, 4-6 mm. thick, but little longer.
g. Leaves hairy. *C. triceps*, p. 298
 - gg. Leaves smooth. *C. caroliniana*, p. 299
 - ff. Spikes several, 3-4 mm. thick, often slightly drooping.
C. swanii, p. 298
- dd. Perigynia reflexed, spikes solitary, 5 mm. thick.
C. exilis, p. 306
- bb. Spike elongated or globular, dense and bristling, somewhat irregular and branched on very short peduncles.
 - e. Spikes yellow or tawny when mature.
 - f. Perigynia enlarged and inflated at the base, long slender beak, much longer than the body. *C. stipata*, p. 306
 - ff. Perigynia firm and not enlarged or inflated at the base, beak shorter than the body.
 - g. Leaves equal to or exceeding the culms.
C. vulpinoidea, p. 306
 - gg. Leaves shorter than the culms. *C. annectens*, p. 307
 - ee. Spikes green.
 - f. Heads nearly globular, 7-15 mm. long, leaves soft.
C. cephalophora, p. 307
 - ff. Heads elongated, 15-40 mm. long, leaves stiff and wiry.
C. muhlenbergii, p. 307
- bbb. Inflorescence, a series of star-like (ovoid in *canescens*) clusters, sometimes close together at the end of the culm, usually with the lower remote.
 - c. Staminate flowers at the base of the spike.
 - d. Perigynia plano-convex, spikes 6-12 mm. long.
C. canescens disjuncta, p. 310
 - dd. Perigynia with thin or winged margins.
 - e. Perigynia broadest at the base, beak rough or serrulate.
 - f. Perigynia never more than half as broad as long, 3-4 mm. long. *C. cephalantha*, p. 309
 - ff. Perigynia more than half as broad as long.
 - g. Scales sharp pointed, leaves 2.5-4.5 mm. broad, inflorescence 15-35 mm. long, spike 15-50 flowered, plant coarse. *C. atlantica*, p. 309
 - gg. Scales blunt, leaves narrower, inflorescence 10-20 mm. long, spike 5-15 flowered; plants slender.
 - h. Leaves 1-2 mm. broad. *C. interior*, p. 308
 - hh. Leaves still narrower. *C. i. capillacea*, p. 308
 - ee. Perigynia broadest near the middle, less than 2 mm. broad, beak short and smooth. *C. seorsa*, p. 309

- cc. Staminate flowers at tip of spike. Perigynia widest above the base, 2.5-4 mm. long, edges minutely serrulate, spikes 3-8, remote except at top of culm, 6-15 flowered, plant weak.

C. rosea, p. 307

- bbbb. Inflorescence consisting of 2-3 clusters of 2-5 flowers, remote on a filiform branched culm, perigynia 3.3-3.8 mm. long.

C. trisperma, p. 310

- aaa. Staminate and pistillate flowers mingled, (staminate usually at the base), in uniform ovoid heads, clustered or usually separate at the end of the scape, each composed of a number of closely imbricated flat perigynia and scales.

- b. Perigynia lanceolate or ovate, 2-5 times as long as wide.

c. Spikes green-brown, blunt. *C. tribuloides*, p. 311

cc. Spikes brown or chestnut. *C. scoparia*, p. 310

- bb. Perigynia ovate, not more than twice as long as wide.

c. Perigynia spreading, heads clustered. *C. straminea*, p. 311

cc. Perigynia erect and appressed, heads usually single, scattered along the stem.

- d. Heads silvery green or nearly white, sea beach species.

C. silicia, p. 311

dd. Heads brown or green-brown. *C. hormathodes*, p. 312

- bbb. Perigynia orbicular or broadly ovate, as broad or even broader than long.

d. Heads green or silvery-green. *C. albolutescens*, p. 313

dd. Heads brown.

e. Achene short stalked. Heads 8-15 mm. long.

C. alata, p. 312

cc. Achene sessile. Heads 6-8 mm. long.

C. festucacea brevior, p. 312

***Carex collinsii* Nutt. Collins' Sedge.**

Pl. XXII., Fig. 3.

Carex Collinsii Nuttall, Gen. II. 205. 1818 [New Jersey].—Keller and Brown 76.

Carex subulata Knieskern 37.—Torrey Ann. Lyc. N. Y. III. 419. 1836.—Willis 71.—Britton 269.

Pine Barren and Middle districts; frequent in almost all the Cedar swamps and in other wooded swamps in the southwestern part of the State, also locally in Hudson, Bergen and Middlesex Counties. This little sedge was named in honor of Zaccheus Collins, a Philadelphia botanist, who, though he published nothing, had probably the most thorough field knowledge of the local flora, of the men of his time. He contributed much information to Nuttall and Barton, and is frequently quoted by them.

Fr.—Mid-June to early July, scattered spikes persisting through the summer.

Middle District.—Shark River, Farmingdale, New Egypt, Griffiths, bel. Washington Park, Lindenwold (KB), Gloucester (KB), Mickleton (H), Swedesboro, Centerton (S), Yorktown.

Pine Barrens.—Allaire, Pt. Pleasant, Manchester (NY), Toms River (KB), Forked River, Waretown, Bamber, Barnegat, Manahawkin, Coxe's, Stafford Forge (S), Browns Mills, Clementon, Jackson, Albion, Cedar Brook, Andrews, Malaga (P), Landisville (T), Hammonton, Folsom, Pancoast, Forks of Batsto, Absecon, Dennisville (OHB).

Cape May.—New England (OHB).

***Carex folliculata* L. Long Sedge.**

Pl. XXII., Fig. 4.

Carex folliculata Linnæus, Sp. Pl. 978. 1753 [Canada].—Knieskern 37.—Willis 71.—Britton 269.

Carex folliculata xanthrophysa Muhlenberg Gram. 244. 1817. Schweinitz and Torrey Ann. Lyc. N. Y. I. 340. 1825.

Frequent in swamps and wet thickets throughout the State, but most abundant in the Pine Barrens.

Fr.—Early June to mid-July.

Middle District.—Shark River, New Egypt, Delaire, Kaighns Pt., Washington Park, Lindenwold (S), Glassboro, Swedesboro, Yorktown.

Pine Barrens.—Allaire, Toms River, Forked River, Coxe's, Browns Mills, Cedar Brook, Albion, Andrew's, Speedwell, Forks of Batsto, Folsom, Hammonton (Bassett), Egg Harbor City.

Cape May.—Court House (S).

***Carex intumescens* Rudge. Bladder Sedge.**

Pl. XXII., Fig. 5.

Carex intumescens Rudge, Trans. Linn. Soc. VII. 97. 1804 [Carolina].—Knieskern 37.—Willis 71.—Britton 269.

Common throughout the State in swampy woods and thickets, except in the Pine Barrens, where it is rather rare and confined to Cedar swamps. The alleged specimens of *C. Asa-grayi* from our region belong to this species.

Fr.—Mid-June to mid-July.

Middle District.—Farmingdale, New Egypt, Kaighns Pt., Camden (Bassett), Medford (S), Glassboro, Mickleton (NB), Swedesboro, Centerton (S), Yorktown, Manumuskine (S).

Pine Barrens.—Allaire, Landisville (T), Head of Batsto, Egg Harbor City.

Coast Strip.—Wildwood.

Carex lupulina Muhl. Hop Sedge.

Pl. XXII., Fig. 1.

Carex lupulina "Muhl.," Schkuhr Riedgr. II. 34. 1806 [Pennsylvania].—Barton Fl. Phila. II. 156. 1818.—Willis 71.—Britton 269.

Edges of swamps in the Northern, Middle and Cape May districts and down the Coastal Strip. Rather uncommon except northward.

Fr.—Mid-June to mid-September (apparently).

Middle District.—Clarksboro, Medford (S), Swedesboro, Salem (S).

Pine Barrens.—Cedar Brook.

Coast Strip.—Anglesea, Wildwood.

Cape May.—Cape May, Dias Creek.

Carex lupuliformis Sartwell. Hop-like Sedge.

Carex lupuliformis "Sartwell," Dewey Am. Jour. Sci (II.) IX. 29. 1850 [N. States and Canada].

Very rare. Known from one station each in Bergen and Sussex Counties, and one in the Middle district.

Fr.—September 16 spikes over mature beginning to break up.

Middle District.—Riddleton.

Carex rostrata utriculata (Boott.)* Bottle Sedge.

Carex utriculata "Boott.," Hooker Fl. Bor. Am. II. 221. 1840 [British America].—Britton 269.—Keller and Brown 77.

Swampy ground, northern counties, and once recorded in the Middle district.

Middle District.—Kaighns Pt. (NB).

Carex bullata Schk. Button Sedge.

Pl. XXII., Fig. 2.

Carex bullata Schkuhr. Riedgr. Nachtr., 1806. 85 [North America].—Britton 269.—Knieskern 37.—Willis 71.

Swamps and bogs of the Pine Barrens common; also locally in the Middle district. I am not fully convinced that this sedge

* *Carex monile* reported by Keller and Brown from Sumner (Clementon) proves to be sterile *C. bullata* with abnormally long heads as determined by Mr. Bayard Long.

should take the name *greeni*, as argued by Prof. Fernald,* and prefer to hold to the familiar name for the present.

Fr.—Mid-June into September.

Middle District.—Lindenwold (S), Lawnside (S), Mickleton (H), Reapupo, Yorktown.

Pine Barrens.—Farmingdale, Allaire, Asbury Park, Lakhurst, Toms River, Browns Mills, Speedwell, Sumner, Cedar Brook, Penbryn (S), Iona (S), Andrews, Folsom, Pancoast, Egg Harbor City, Tuckahoe (S).

Carex lurida Wahl. Sallow Sedge.

Pl. XXIII., Fig. 1.

C[arex] lurida Wahlenberg, Kongl. Acad. Handl. (II.) 24. 153. 1803 [North America].—Britton 270.

Carex tentaculata Knieskern 37.—Willis 71.

Common in swamps throughout the State except in the Pine Barrens, where it is rare and for the most part close to the border.

Fr.—Mid-June to late July.

Middle District.—Seabright, Farmingdale, New Egypt, Riverside, Browns Mills, Haddonfield (S), Sharpstown, Swedesboro.

Pine Barrens.—Allaire (S), Forked River, Winslow (S), Albion, Penbryn (S), Landisville, Hammonton, Egg Harbor City.

Coast Strip.—Piermont.

Cape May.—Cape May, Cold Spring.

Carex hystericina Muhl. Porcupine Sedge.

Carex hystericina "Muhl," Willdenow Sp. Pl. IV. 282. 1805 [Pennsylvania].

Carex hystricina Knieskern 37.—Willis 71.—Britton 270.

Swampy ground in the Northern and Middle districts; apparently not common within our limits.

Fr.—Late May to late June.

Middle District.—New Egypt, five mi. S. of Mickleton, Lindenwold (S).

Carex comosa Boott. Bottle-brush Sedge.

Pl. XXIII., Fig. 2.

Carex comosa Boott, Trans. Linn. Soc. XX. 117. 1846 [Boston, Mass.]

Carex Pseudo-cyperus Britton 270.

Frequent in swamps of the Northern and Middle districts and Coastal Strip. Not reported from the Pines.

Fr.—Early June to mid-July, and more rarely through the summer.

*Rhodora 1906, p. 202.

Middle District.—New Egypt, Lindenwold, Medford (S), Washington Park, Five miles south of Mickleton, Swedesboro, Salem (C).

Coast Strip.—Piermont, Wildwood, Anglesea, Holly Beach (T), Court House, Cold Spring (S), Cape May.

Carex squarrosa L. Squarrose Sedge.

Carex squarrosa Linnæus, Sp. Pl. 973. 1753 [Canada].

Damp open ground of the Northern and locally in the Middle district. Rare within our limits.

Fr.—Mid-June into August.

Middle District.—One mile south of New Egypt, Moorestown (H), Swedesboro (H).

Carex typhinoides Schwein. Cat-tail Sedge.

Carex typhinoides Schweinitz, Ann. Lyc. I. 66. 1824 [North Carolina].

Swampy ground, lower part of Middle district, very rare. Known from a single station only.

Fr.—Mid-June probably into August.

Middle District.—Riddleton.

Carex trichocarpa Muhl. Hairy-fruited Sedge.

Pl. XXV., Fig. 5.

Carex trichocarpa (Muhl.) Willdenow, Sp. Pl. IV. 302. 1805 [Pennsylvania].—Britton 271.—Keller and Brown 78.

Open swampy ground in the Northern district, and rare and local in the Middle district.

This species was found by the writer near Medford; previously it was only known from the northern counties.

The record from Cedar Brook, given by Keller and Brown, proves to be erroneous.

Fl.—Full flower May 30, but achenes well formed.

Middle District.—Medford (S).

Carex lacustris Willd. Riverbank Sedge.

Pl. XXIII., Fig. 6.

Carex lacustris Willdenow, Sp. Pl. IV. 306. 1805 [Pennsylvania].

Carex riparia Barton, Fl. Phila. II. 158. 1818.—Britton 271.—Keller and Brown 78.

Wet open swamps in the northern counties, local southward in the Middle and rarely in the Pine Barren and Cape May districts.

Fr.—Late May to late June.

Middle District.—Crosswicks Creek, Bordentown, Delair, Swamps Gloucester Co. (C), Woodstown, Salem (H).

Pine Barrens.—Manchester (P).

Cape May.—Cold Spring.

***Carex vestita* Willd. Velvet Sedge.**

Pl. XXV., Fig. 7.

Carex vestita Willdenow, Sp. Pl. IV. 263. 1805 [N. America].—Knieskern 36.—Willis 71.—Britton 270.—Keller and Brown 78.

Damp sandy soil; most plentiful in the Middle district, occasional in the Northern and Cape May districts and rare in the Pine Barrens.

Fr.—Late May to late July.

Middle District.—Farmingdale, Delanco, Merchantville (P), Camden (KB), Haddonfield (KB), Lindenwold (S), Clementon (S), Washington Park (KB), Woodbury, Mickleton (S), Sicklerville, Swedesboro.

Pine Barrens.—Allaire, Winslow Inc., Spring Garden (P), Hammonton (Bassett), Egg Harbor City (B. Smith), Palermo.

Cape May.—Rio Grande (OHB), New England (OHB), Cape May (S).

***Carex walteriana* Bailey.* Walter's Sedge.**

Pl. XXIII., Fig. 7.

Carex Walteriana Bailey, Bull. Torr. Club. XX. 429. 1893 (new name for *C. striata* Michaux) [Carolina].—Keller and Brown 78.

Carex striata Knieskern 36.—Willis 71.

Carex striata var. *brevis* Britton 271.

Plentiful in bogs of the Pine Barrens, where it is the most characteristic and abundant *Carex*; rare and local in the lower Middle district and on the coastal islands.

Fr.—Early June to late July.

Middle District.—New Egypt (NB), Mickleton (S).

Pine Barrens.—Lakelhurst, Manchester (C), Pt. Pleasant, Toms River, Forked River, Waretown, Barnegat, Tuckerton, High Bridge (S), Speedwell, White Horse (S), Bear Swamp, Jackson, Clementon, Cedar Brook, Berlin (KB), Williamstown (H), Iona (S), Winslow Inc., Quaker Bridge, Hammonton (KB), Mays Landing, Sea Isle Inc., Woodbine (S).

* A specimen of *Carex scabrata* is in the collection of the Phila. Academy, labelled Cedar Brook, N. J., July 12th, 1892, Herbarium of Jos. Crawford. Mr. Crawford, however, was at Hamburg, Pa., on this date and other specimens of this sedge obtained by him at Hamburg, July 11th, 1892, are exactly like this one. I therefore feel sure that an error has been made in writing this label. We have no other evidence of the occurrence of the plant within our limits.

Coast Strip.—Wildwood.

Cape May.—Cape May (OHB).

***Carex lanuginosa* Michx. Woolly Sedge.**

Pl. XXIII., Fig. 3.

Carex lanuginosa Michaux, Fl. Bor. Am. II. 175. 1803 [Iacus Mistassins]
—Knieskern 36.—Willis 71.—Keller and Brown 78.

Carex filiformis var. *lanuginosa* Britton 271.

Frequent in the northern counties in low moist ground, and down the coast strip to Cape May. Rare in the Middle district and unknown from the Pine Barrens.

Fr.—Early June to early July.

Middle District.—Mickleton (H).

Coast Strip.—Squan (C), Bayhead, Toms River (NY), Palermo, Piermont, Cape May Ct. House, Cold Spring.

Pine Barrens.—Landisville (T), (introduced ?).

***Carex buxbaumi*. Brown Sedge.**

Pl. XX., Fig. 4.

Carex Buxbaumi Wahlenberg, K. Vet. Akad. Handl. 164. 1803 [Sweden and Lapland].—Britton 271.

Marshes and bogs; rare. A few stations in the Northern and Middle districts north of our limits and one in the Cape May peninsula.

Fr.—Mid-May to early June, rarely slightly later.

Cape May.—Cold Spring.

***Carex stricta* Lam.* Tussock Sedge.**

Pl. XXV., Fig. 1.

Carex stricta Lamarck, Encycl. III. 387. 1789 [Virginia, Pennsylvania, etc.].
—Knieskern 36.—Willis 70.—Britton 271.

* *Carex haydeni* Dewey (Amer. Jour. Sci. II., 18. 103. 1854.—Missouri R. near Ft. Pierre), is recorded from Morris Co. and Assinpink marsh, both north of our range. Also stated to occur in Camden Co. by Mr. C. E. Smith, but no definitely labelled specimens are extant to corroborate his record. I am also unable to find anything to verify the record for *C. aquatilis*, given in Britton's Catalogue, on the authority of Mr. C. F. Parker, for Camden Co. Possibly it referred to the same plant as Mr. Smith's record of *C. haydeni*—possibly an aberrant *C. stricta*.

C. salina, reported with some doubt by Knieskern from near Manchester, has not been verified.

Common in open swamps of the Northern and Middle districts, forming the familiar "tussocks."

Fr.—Mid-May to mid-June.

Middle District.—Farmingdale, New Egypt, Toms River (NB), Delanco, Delaire, Camden, Medford (S), Lindenwold (S), Glassboro, Pitman, Mickleton, Repaupo, Swedesboro, Quinton.

Coast Strip.—Toms River (NY), Cold Spring.

***Carex prasina* Wahl. Drooping Sedge.**

Carex prasina Wahlenberg, Kongl. Vet. Akad. Handl. (II.) 24. 161. 1803 [North America].—Britton 272.—Kellar and Brown 79.

Damp ground, usually in woods; Northern and Middle districts.

Fr.—Late May to mid-June.

Middle District.—Mullica Hill (H), Mickleton (H), Swedesboro.

***Carex barrattii* Schw. and Torr. Barratt's Sedge.**

Pl. XXIII., Fig. 4.

Carex Barrattii Schweinitz and Torrey, Ann. Lyc. N. Y. I. 361. 1825 [Cape May, N. J.].—Willis 70.—Britton 272.

Carex littoralis Schweinitz, Ann. Lyc. N. Y. I. 70. 1824 [Cape May, N. J.]. (nec. *C. littoralis* Koch 1814).—Kellar and Brown 79.

Carex flacca Gray, Man. Ed. I. 549. 1848.—Knieskern 36.

Swamps in the Pine Barrens and west Jersey; local and not common. Occasional also in southern Cape May County. A beautiful species first discovered by Zaccheus Collins.

Fr.—Mid-May to mid-June.

Middle District.—Shark River, Mickleton (NB), Clarksboro.

Pine Barrens.—Manchester (NB), Browns Mills, Cedar Brook, Spring Garden, Winslow (P), White Horse, Egg Harbor.

Cape May.—Cold Spring (S).

***Carex limosa* L. Mud Sedge.**

Pl. XXIII., Fig. 5.

Carex limosa Linnæus, Sp. Pl. 977. 1753 [Europe].—Britton 272.—Kellar and Brown 79.

Bogs, not common, restricted to the Northern and Middle districts.

Fr.—Early June to early July, or possibly later.

Middle District.—Repaupo, Swedesboro.

Carex crinita Lam. **Fringed Sedge.**

Pl. XXI, Fig. 6.

Carex crinita Lamarck, Encycl. III. 393. 1789 [Virginia].—Knieskern 36.
—Willis 70.—Britton 272.

Common in swamps throughout the State, except in the Pine Barrens, where it is rare.

Fr.—Early June to mid-July.

Middle District.—Farmingdale, Riverside, Millville, Yorktown.

Pine Barrens.—White Horse, Landisville.

Coast Strip.—Beach Haven (L).

Cape May.—West of Wildwood Jnc., Goshen (S), Cape May (S).

Carex gynandra Schwein. **Nodding Sedge.**

Carex gynandra Schweinitz, Ann. Lyc. N. Y. I. 70. 1824 [Lower South Carolina].

Occasional in swampy ground of the Northern, Middle and Coast districts.

Fr.—Late May to early July.

Middle District.—New Egypt, Albion, Washington Park, Lindenwold (S), Swedesboro.

Coast Strip.—Five-Mile Beach.

Carex swanii (Fernald.). **Downy Green Sedge.**

Pl. XXV., Fig. 6.

Carex virescens var. *Swanii* Fernald, Rhodora 1906. 183 [Manchester, Vt.]
(new name for *C. virescens* of recent authors which is the same as *C. costellata* Britton).

Common in dry woods throughout the State, except in the Pine Barrens, where it is rare (and perhaps introduced).

Fr.—Early June to late June.

Middle District.—Farmingdale, Washington Park, Repaupo, Mickleton, Riddleton, Swedesboro, Yorktown, Millville.

Pine Barrens.—Cedar Brook, Atsion, Egg Harbor City, Belleplain (P).

Coast Strip.—Barnegat City (L), Avalon, Wildwood.

Cape May.—Fishing Creek.

Carex triceps Michx. **Hirsute Sedge.**

Pl. XXV., Fig. 2.

Carex triceps Michaux, Fl. Bor. Am. II. 170. 1803 [Carolina].
Carex triceps var. *hirsuta* Britton 272.

Dry woods and fields; common throughout the State, except in the Pine Barrens, where it is rare. Specimens from Swedesboro and Egg Harbor City are referable to *C. t. bushii* according to Mr. Bayard Long.

Fr.—Early June to early July.

Middle District.—Clarksboro, Swedesboro, Riddleton.

Pine Barrens.—Landisville (T), Egg Harbor City.

Cape May.—Cold Spring (S), Whitesboro (S), Green Creek (OHB), Bennett (OHB), Cape May (P).

***Carex caroliniana* Schw. Carolina Sedge.**

Carex caroliniana Schweinitz Ann. Lyc. N. Y. I. 67. 1824 [Carolina].—Keller and Brown 80.

Carex Smithii Willis 70.—Britton 272.

Confined to low moist ground in the Middle district along the Delaware River.

Fr.—Early June to late June.

Middle District.—Crosswicks, Camden (NB), Timber Creek, Washington Park, Red Bank, Clarksboro, Riddleton.

***Carex tenuis* Rudge. Slender-stalked Sedge.**

Carex tenuis Rudge, Trans. Linn Soc. VII. 97. 1804 [Long Island, N. Y.].—Keller and Brown 81.

Carex flexuosa Barton, Fl. Phila. II. 158. 1818.

Carex debilis Knieskern 36.—Willis 71.—Britton 273.

Woodland; common in the Northern and Middle districts.

Fr.—Early June to late June.

Middle District.—Delair, Washington Park, Medford (S), Center Square, Mickleton, Pitman, Glassboro, Swedesboro, Riddleton.

Coast Strip.—Asbury Park, Pt. Pleasant, Manahawkin.

***Carex oblita* Steud. Dark-green Sedge.**

Pl. XXV., Fig. 3.

Carex oblita Steudel, Syn. Pl. Cyp. 231. 1855 [New Orleans, La.].—Keller and Brown 81.

Carex glabra Willis 71.

Carex venusta var. *glabra* Britton 273.

In bogs of the Middle and Cape May districts frequent; and occasional in the Pine Barrens, especially near the coast.

Fr.—Early June to late June.

* Mr. Lippincott's record of *C. arctata*, at Swedesboro, in Keller and Brown's list proves to be young *C. styloflexa*.

Middle District.—Farmingdale, Camden, Grenloch, Lindenwold, Griffith's Swamp, Lawnside (S), Washington Park, Clementon, Albion, Mickleton (H), Glassboro, Yorktown.

Pine Barrens.—Allaire (S), Forked River, Vineland (S), Winslow Jnc., Absecon, Mays Landing (KB), Egg Harbor City.

Cape May.—Cape May.

Carex grisea Wahl. Gray Sedge.

Pl. XXIV., Fig. 2.

Carex grisea Wahlenberg, Kongl. Vet. Akad. Hamdl (II.) 24. 154. 1803 [North America].—Knieskern 36.—Willis 70.—Gray Man. Ed. I. 552. 1848.—Britton 273.—Keller and Brown 81.

In meadows in the northern counties; south locally in the Middle district.

Fr.—Late May to mid-June.

Middle District.—Farmingdale, New Egypt, Delair, Medford (S), Washington Park, Mickleton (NB).

Carex glaucoidea Tuckerm. Glaucous Sedge.

Carex glaucoidea "Tuckerman," Olney Proc. Am. Acad. VII. 395. 1868 [Summits of Mt. Holyoke and Mt. Tom].—Britton 277.—Keller and Brown 81.

Carex grisea var. *mutica* Knieskern 36.—Willis 70.

Dry ground; tolerably common in the Middle district, casual farther north and rare in the lower Cape May peninsula.

Fr.—Early June to late June.

Middle District.—Hornerstown (C), Haddonfield (P), Almonessen, Woodbury (H), Clarksboro, Swedesboro, Riddleton.

Cape May.—Cape May (OHB).

Carex granularis Muhl. Meadow Sedge.*

Pl. XXIV., Fig. 5.

Carex granularis "Muhl.," Willdenow, Sp. Pl. IV. 279. 1805 [Pennsylvania]. Britton 273.—Keller and Brown 81.

In meadows; frequent in the Northern counties, rare in the Middle and Cape May districts. The Cape May plant is not typical and was questionably referred to *C. haleana* Olney, but its peculiarities are probably merely the result of its environment.

Fr.—Early June to late June.

* *Carex flava* L., accidentally omitted from the text, was collected in the Kaighn's Pt. swamp by Parker in 1865 (Britton's Catalogue). What *C. oederi* reported by Martindale from Atsion, may have been I cannot suggest. No specimen has been seen.

Middle District.—New Egypt, Medford (S), Grenloch, Red Bank, Swedesboro, Riddleton.

Cape May.—Cold Spring.

Carex polymorpha Muhl.* Variable Sedge.

Carex polymorpha Muhlenberg, Gram. 239. 1817 [Pennsylvania].—Knieskern 36.—Willis 71.—Gray Man. Ed. I. 550.—Britton 275.—Keller and Brown 82.

Meadows; rare and local. Discovered June 9, 1890, at Mickleton by Mr. Benj. Heritage; also known from two stations in the northern counties and given in Knieskern's list. Mr. Crawford's record from Cedar Brook (K. and B.) was apparently something else.

Middle District.—Mickleton.

Carex conoidea Schk. Field Sedge.

Carex conoidea Schkuhr, Riedgr. Nachtr. 67, f. 168. 1806 [North America].—Britton 274.—Keller and Brown 82.

Damp open ground of the northern counties; very rare in the Middle district. Collected by C. D. Lippincott at Swedesboro. June 4, 1893.

Fr.—Late May to mid-June.

Middle District.—Swedesboro.

Carex tetanica Schk. Wood's Sedge.

Pl. XXIV., Fig. 4.

Carex tetanica Schkuhr, Riedgr. Nachtr. 68, figs. 100, 207. 1806 [Pennsylvania].

Bogs; not common. Northern and Middle districts. Discovered by the writer at Lindenwold, and previously by Mr. C. D. Lippincott at Swedesboro.

Fr.—Early June to early July.

Middle District.—Lindenwold (S), Swedesboro.

Carex laxiflora Lam. Loose-flowered Sedge.

Carex laxiflora Lamareck, Encycl. III. 392. 1789 [N. Y., Penna., Va.].—Knieskern 36.—Willis 71.—Britton 274.

Carex anceps Pursh Fl. Am. Sept. I. 42. 1814.—Barton Fl. Phila. II. 157. 1818.

**Carex pallescens* is given by Keller and Brown from Swedesboro on authority of Chas. D. Lippincott, and from New Egypt in Knieskern's list. Mr. Lippincott, however, states that he never found the species, and Knieskern's specimen is not extant.

This species is apparently very rare within our limits and does not seem to spread into the coastal plain to any extent.

Fr.—Late May to late June.

Middle District.—Medford (S), Swedesboro, Camden (P).

***Carex laxiflora patulifolia* (Dewey.). Ribbon-leaved Sedge.**

Pl. XXIV., Fig. 3.

Carex anceps var. *patulifolia* Dewey, Wood's Bot. 423. 1845 [no locality given].

Carex laxiflora var. *patulifolia* Knieskern 36.—Willis 71.—Keller and Brown 82.

In dry woods of the Middle and probably also the Northern district.

Fr.—Late May to late June.

Middle District.—Pt. Pleasant, Medford (S), Mickleton, Swedesboro, Camden (P).

***Carex styloflexa* Buckley. Bent-beaked Sedge.**

Pl. XXIV., Fig. 7.

Carex styloflexa Buckley, Amer. Jour. Sci. 45. 174. 1843 [Mountains of Macon Co., N. C.].—Keller and Brown 82.

Carex laxiflora styloflexa Willis 71.—Britton 274.

Wet meadows; Northern, Middle and Cape May districts.

Fr.—Late May to late June.

Middle District.—Farmingdale, New Egypt, Asbury Park, Medford (S), Washington Park, Mickleton, Lindenwold.

Cape May.—Cape May.

***Carex digitalis* Willd. Slender Wood Sedge.**

Carex digitalis Willdenow, Sp. Pl. IV. 298. 1805 [Pennsylvania].—Knieskern 36.—Willis 71.—Britton 274.

Dry woods of the northern counties; rare in the Middle district.

Fr.—Late May to late June.

Middle District.—Squan (C), Riddleton, Swedesboro (CDL).

***Carex laxiculmis* Schwein.* Spreading Sedge.**

**C. albusina* is included in Keller and Brown's list from Swedesboro and Mickleton, but I can find no specimens to substantiate the record. Specimens of *C. laxiculmis* have sometimes been mistaken for it.

Pl. XXIV., Fig. 6.

Carex laxiculmis Schweinitz, Ann. Lyc. N. Y. I. 70. 1824 [Carolina].

Rich woods, northern counties; rare in the Middle district.

Fr.—Late May to late June.

Middle District.—Sewell (S), Mickleton.

Carex abscondita Mackenzie. **Thicket Sedge.**

Pl. XXIV., Fig. 8.

Carex abscondita Mackenzie, Bull. Torr. Bot. Club, May, 1910, p. 244 [new name for *C. ptychocarpa* Steud., nec Link 1799—New Orleans, La.]

Carex ptychocarpa Keller and Brown 83.

Woods, Middle and Cape May districts; casual northward.

Fr.—Late May to late June.

Middle District.—Farmingdale, Pt. Pleasant (S), Bayhead, New Egypt, Riverside, Medford (S), Kirkwood, Center Square, Albion, Sumner, Swedesboro, Riddleton, Yorktown.

Cape May.—Dennisville (OHB), Cold Spring, Cape May.

Carex livida (Wahl.). **Livid Sedge.**

Pl. XXIV., Fig. 1.

Carex limosa var. *livida* Wahlenberg, Kongl. Vet. Akad. Handl. (II) 24. 162. 1803 [Lapponiæ Enontekensis].

Carex livida Gray, Man. Ed. I. 550. 1848.—Torrey, Ann. Lyc. N. Y. III. 417. 1836.—Kneiskern 36.—Willis 70.—Britton 275.—Keller and Brown 83.

Rather frequent in bogs in the Pine Barrens.

Fr.—Late May to late June.

Pine Barrens.—Lakehurst, Toms River (McK), Double Trouble, Bamber, High Bridge (S), Speedwell, Cedar Brook, Ancora, Atsion (P).

Carex pedunculata Muhl. **Long-stalked Sedge.**

Carex pedunculata Muhlenberg, Willdenow, Sp. Pl. IV. 222. 1805 [Pennsylvania].

Occasional in the northern counties. Very rare within our limits.

Fr.—Early May to late May.

Middle District.—New Egypt.

Carex pennsylvanica Lam. **Pennsylvania Sedge.**

Pl. XXVI., Fig. 12.

Carex Pennsylvanica Lamarck, Encycl. III. 388. 1791 [Pennsylvania].

Knieskern 36.—Willis 71.—Britton 275.

Dry ground; common throughout the State, unless it be on the coast and Cape May peninsula.

Fr.—Mid-May to mid-June.

Middle District.—Asbury Park, Hainesport, Delanco, Westville, Mantua, Sewell (S), Woodbury, Washington Park.

Pine Barrens.—Brown's Mills, Clementon, Cedar Brook, Pleasant Mills, Hammonton, Mays Landing (S).

***Carex varia emmonsi.* Emmons' Sedge.**

Pl. XXVI., Fig. 9.

Carex varia var. *Emmonsi* "Dewey," Torrey, Ann. Lyc. N. Y. II. 411. 1836 [Massachusetts].—Britton 275.—Keller and Brown 84.

Carex Nova-angliæ Knieskern 36.

Carex Emmonsii Willis 71

Common in dry ground except in the Pine Barrens.

Fr.—Early May to early June.

Middle District.—Bordentown, Kinkora, Delaire, Fish House, Merchantville, Haddonfield, Medford (S), Woodbury, Wenonah, Glassboro, Pitman, Mickleton, Swedesboro, Alloway, Quinton.

Coast Strip.—Sea Bright (NB), Surf City (L), Barnegat City (L), N. Beach Haven (L), Palermo.

Cape May.—Cold Spring.

***Carex umbellata* Schk. Umbel-like Sedge.**

Pl. XXVI., Fig. 15.

Carex umbellata Schkuhr, Riedgr. Nachtr. 75. f. 171. 1806 [Pennsylvania].—Knieskern 36.—Willis 71.—Britton 276.—Keller and Brown 84.

Rather frequent in the Middle district.

Fr.—Late April to early June.

Middle District.—Allaire, Farmingdale, Mantua.

Coast Strip.—Tuckahoe.

***Carex umbellata tonsa* Fernald.**

Carex umbellata var. *tonsa* Fernald, Proc. Am. Acad., vol. 37. 1902. 507 [Maine and Connecticut].

Frequent in the Middle and Pine Barren districts.

Fr.—Late April to early June.

Middle District.—New Egypt, Hainesport, Mt. Holly, Browns Mills, Lindenwold, Clementon.

Pine Barrens.—Albion, Whitings, Hammonton, Tuckahoe.

Carex umbellata abdita Bicknell.

Carex umbellata var. *abdita* Bicknell, Bull. Torr. Bot. Club, XXXV, 492. 1908 [Richmond Hill, L. I.].

Apparently not rare; confined to the Middle district.

Fr.—Late April to early June.

Middle District.—Bordentown, Woodbury Hts., Alloway, Quinton.

Carex nigro-marginata Schw. Black-edged Sedge.

Carex nigro-marginata Schweinitz, Ann. Lyc. N. Y. I. 68. 1824 [Carolina].
—Gray, Man. Ed. V., Issue 8, p. 682. 1868.

Locally through the Northern, Middle and Coast districts in dry ground.

Fr.—Late April to late May.

Middle District.—Hartford, Fish House, Camden (P), Mantua, Woodbury, Wenonah, Glassboro, Pennsgrove (C), Alloway.

Coast Strip.—Surf City (L), Palermo, Wildwood, Cape May Ct. House, Cape May.

Carex willdenowii Schk. Willdenow's Sedge.*

Carex willdenowii Schkuhr, Riedgr. Nachtr. 33. f. 145. 1806 [North America].—Britton 276.—Keller and Brown 84.

In woods of the northern counties; very rare within our limits, resting solely on Mr. C. E. Smith's record for the vicinity of Woodbury. No specimen has been seen.

Middle District.—Woodbury (C).

Carex leptalea harperi Fernald. Harper's Sedge.

Pl. XXVI., Fig. 14.

Carex harperi Fernald, Rhodora, Sept., 1906. 181. [Near Louisville].—Long, Bartonias II. 19. 1910.

Bogs of the lower Middle and Cape May districts. It may be that true *C. leptalea* occurs along our northern border, but Mr. Bayard Long, who has studied the material carefully, is of the opinion that specimens so identified are merely immature.

Fr.—Late June to late July.

* *Carex pubescens* is recorded from Swedesboro by Keller and Brown on authority of C. D. Lippincott, but Mr. Lippincott tells me that there was an error in transcribing his list, as he never found the species at Swedesboro.

Middle District.—Delanco, Lindenwold, Clementon, Mickleton.

Coast Strip.—Forked River.

Cape May.—Goshen, Bennett, Cold Spring.

Carex exilis Dewey. Coast Sedge.

Pl. XXVI., Fig. 13.

Carex exilis Dewey, Am. Jour. Sci. XIV. 351. 1828 [Danvers, Mass.].—Torrey, Ann. Lyc. N. Y. III. 387. 1836.—Knieskern 35.—Willis 70.—Britton 277.—Keller and Brown 85.

Frequent in swamps in the Pine Barrens, reaching the edge of the salt marsh occasionally where arms of the Pine Barrens extend seaward.

Fr.—Mid-May to mid-June.

Pine Barrens.—Shark River (C), Farmingdale, Davenport, Manchester (P), Burrsville (C), Pt. Pleasant, Toms River (NY), Bamber, West Creek, Tuckerton, Hanover (C), New Germany (T), Hammonton (KB), Absecon (C), Palermo, Egg Harbor City (H).

Carex teretiuscula Gooden. Little Panicked Sedge.

Carex teretiuscula Goodenow, Tr. Linn. Soc. II. 163. 1794 [Norwich, England].—Keller and Brown 85.

Occasional in swamps of the northern counties and very rare in the Middle district, where it was found by Mr. Benj. Heritage

Middle District.—Mickleton.

Carex stipata Muhl. Awl-fruited Sedge.

Pl. XXI., Fig. 1.

Carex stipata "Muhl." Willdenow, Sp. Pl. IV. 233. 1805 [Pennsylvania].—Knieskern 35.—Willis 69.—Britton 276.—Keller and Brown 85.

Meadows and open swamps; common in the Northern and Middle districts.

Fr.—Mid-May to late June.

Middle District.—Farmingdale, New Egypt, Camden (P), Delaire, Delanco, Medford (S), Washington Park, Woodbury, Pitman, Mickleton, Swedesboro.

Carex vulpinoidea Michx. Fox Sedge.

Pl. XXI., Fig. 2.

Carex vulpinoidea Michaux, Fl. Bor. Am. II. 169. 1803 [Canada and New England].—Knieskern 35.—Willis, 69.—Britton 276.

Meadows and open swamps; common in the Northern and Middle districts and occasional on the coast.

Fr.—Early June to mid-July.

Middle District.—Seabright, New Egypt, Riverside, Medford (S), Camden (P), Mickleton, Swedesboro, Yorktown.

Pine Barrens.—Landisville (introduced?).

Coast Strip.—Avalon, Beach Haven (L).

***Carex annectens* Bicknell. Yellow-fruited Sedge.**

Carex xanthocarpa annectens Bicknell, Bull. Torr. Bot. Club XXIII. 22. 1896 [New York].

Carex xanthocarpa Keller and Brown.

Frequent in low grounds of the Middle district and occasional in the Pine Barrens.

Fr.—Early June to early July.

Middle District.—Farmingdale, Medford (S), Lindenwold (S), Browns Mills Inc., Yorktown.

Pine Barrens.—Forked River, Landisville.

***Carex rosea* Schk. Stellate Sedge.**

Carex rosea Schkuhr Riedgr. Nachtr. 15 f. 179. 1806 [North America].—Knieskern 35.—Willis 69.—Britton 276.

Carex rosea var. *radiata* Britton 276.

Common in dry woods in the Northern and Middle districts.

Fr.—Mid-May to mid-June.

Middle District.—Farmingdale, Sewell (S), Glassboro, Mickleton, Swedesboro.

***Carex cephalophora* Muhl. Oval-headed Sedge.**

Pl. XXI., Fig. 4.

Carex cephalophora "Muhl." Willdenow, Sp. Pl. IV. 220. 1805 [Pennsylvania].—Knieskern 35.—Willis 69.—Britton 277.—Keller and Brown 86.

Common in the northern counties, but rare southward within our limits.

Fr.—Early June to late June.

Middle District.—Sewell (S), Swedesboro.

Cape May.—Cold Spring.

Carex muhlenbergii* Schk. Muhlenberg's Sedge.

Pl. XXI., Fig. 3.

Carex Muhlenbergii Schkuhr. Riedgr. Nachtr. 12. f. 178. 1806 [North America].—Muhlenberg, Gram. 221. 1817.—Knieskern 35.—Willis 69.—Britton 277.—Keller and Brown 86.

* The records of *C. sparganoides* and *cephaloidea*, given in Keller and Brown's list for our region, all prove to belong to *muhlenbergii* or *cephalophora*, and we have no evidence of the occurrence of the former species within our limits.

Frequent in woods and thickets in the Northern and Middle districts, occasional on the Coast and Cape May peninsula.

Fr.—Early June to mid-July.

Middle District.—Pemberton Jnc. (S), Griffith's Smp. (C), Haddonfield (S), Medford (S), Mickleton (NB), Swedesboro.

Pine Barrens.—White House (S).

Coast Strip.—Somers Pt., Atlantic City (P), Wildwood, Cold Spring.

Cape May.—Bennett. *

Carex interior Bailey.* Inland Sedge.

Pl. XXVI., Fig. 10.

Carex interior Bailey, Bull. Torr. Bot. Club. XX. 426. 1893 [Me. to Minn. and Kansas].

Carex stellulata vars. *sterilis*, *scirpoides* Knieskern 35.

Carex echinata var. *radiata* Britton 277.

Carex interior Keller and Brown 87.

Carex sterilis cephalantha Keller and Brown 87.

Somewhat local in bogs and swampy ground of the Middle district. According to Prof. Fernald this species should bear the name *C. scirpoides* Schkuhr., but I prefer to adopt Mr. Mackenzie's views upon the subject.*

Fr.—Mid-May to mid-June.

Middle District.—New Egypt, Lindenwold, Swedesboro.

Carex interior capillacea (Bailey.)* Thread-like Sedge.

Carex interior var. *capillacea* Bailey, Bull. Torr. Bot. Club XX. 426. 1893 [Mass., N. J. and Penna.].

Carex stellulata var. *angustata* Knieskern 35.

Frequent in bogs of the Middle and Pine Barren districts, especially in the latter, and occasional on the Coast Strip and Cape May peninsula. *C. scirpoides capillacea* according to Fernald.

Fr.—Mid-May to mid-June.

Middle District.—New Egypt, Medford (S), Mickleton, Yorktown.

Pine Barrens.—Forked River, Browns Mills, Bear Swamp, Cedar Brook, Andrew's, Ancora, Clementon.

Coast Strip.—Spray Beach (L).

Cape May.—Cape May (S), Cold Spring.

* Cf. Fernald, Proc. Amer. Acad. XXXVII. 457-485, 1902. Mackenzie, Bull. Torr. Bot. Club XXXVII., 249, 1910.

Carex cephalantha (Bailey). Prickly Sedge.

Carex echinata var. *cephalantha* Bailey, Mem. Torrey Bot. Club. I. 58. 1889
[Penna., Mass., N. Y. and Mich.]

Frequent along the upper coast strip and occasional in the upper Middle district to Cape May. Probably common northward.

Fr.—Late May to mid-June.

Middle District.—New Egypt, Mt. Holly, Center Square.

Coast Strip.—Asbury Park, Forked River, N. Beach Haven (L), Peahala (L), Spray Beach (L), Beach Haven Terrace (L).

Cape May.—West Cape May.

Carex atlantica Bailey.* Coastal Plain Sedge.

Pl. XXVI., Fig. 11.

Carex atlantica Bailey, Bull. Torrey Bot. Club XX. 425. 1893 [Newfoundland to Florida, coastal].

Carex stellulata Knieskern 35.—Willis 70.

Carex Atlantica Keller and Brown 87.

Carex echinata conferta Britton 277.

Common in bogs of the Pine Barrens and occasional in the Middle and Cape May districts.

Fr.—Late May to late June.

Middle District.—Farmingdale, Lindenwold, Swedesboro (CDL), Yorktown.

Pine Barrens.—Asbury Park, Pt. Pleasant, Davenport, Lakehurst, Bear Swamp, Sumner, Albion, Andrews, Cedar Brook, Ancora (H), Jackson, Browns Mills.

Cape May.—Cape May.

Carex seorsa Howe Howe's Sedge.

Carex seorsa E. C. Howe, Rept. N. Y. Mus. Nat. Hist. No. 48. 40. 1895
[Lansingburgh, Rensselaer Co., N. Y.].

Occasional in the Middle and Cape May districts.

Fr.—Mid-May to early June.

Middle District.—Medford, Albion, Yorktown.

Cape May.—Dennisville.

* One specimen from Medford resembles *Carex incompta* Bicknell.

Carex canescens disjuncta Fernald. **Silvery Sedge.***

Pl. XXI., Fig. 5.

Carex canescens var. *disjuncta* Fernald, Proc. Amer. Acad. 37. 488. 1902 [Eastern N. A.].*Carex canescens* Knieskern 35.—Willis 70.—Britton 278.—Keller and Brown 87.*Carex brunnescens gracilior* Keller and Brown 87.

Bogs of the Middle and Pine Barren districts, locally common.

Fr.—Late May to early June.*Middle District.*—Farmingdale, Delanco, Camden, Mt. Holly, Westville (P), Medford (S), Center Square, Glassboro, Pitman, Mickleton.*Pine Barrens.*—Toms River (NY), Forked River, Speedwell, Jackson, Albion, Clementon, Landisville.**Carex trisperma** Dewey. **Three-fruited Sedge.***Carex trisperma* Dewey, Am. Jour. Sci. IX. 63. 1825 [Williamstown and Deerfield, Mass.].—Knieskern 35.—Willis 70.—Britton 278.—Keller and Brown 87.

Bogs of the Northern district and Pine Barren Cedar Swamps, frequent.

Variety *billingsii* Knight, credited to New Jersey in the new Gray's Manual, seems to be too poorly characterized to warrant recognition, at least so far as our material is concerned.*Fr.*—Mid-June to late August, or occasionally into early autumn.*Pine Barrens.*—Manchester (C), Lakehurst, Toms River (S), Bamber, Pasadena, Double Trouble, Spring Garden (P), Waterford, Cedar Brook (KB), Malaga (P), Andrews, Landisville, Dennisville (P).**Carex scoparia** Schk. **Pointed Broom Sedge.**

Pl. XXVI., Fig. 1.

Carex scoparia Schkuhr, Riedgr. Nachtr. XX. f. 175. 1806 [North America].—Knieskern 35.—Willis 70.—Britton 278.

* *Carex brunnescens* has several times been recorded from southern New Jersey, but no authentic specimens have come to my notice, and it is, I think, safe to say that the records were the result of misidentification. Such as I have examined seem to be young of the present species.

Common in moist open ground throughout the Northern, Middle and Cape May districts. Local and apparently of recent introduction in the Pine Barrens.

Fr.—Late May to mid-July (apparently).

Middle District.—Farmingdale, Sea Bright, New Egypt, Browns Mills, Medford (S), Lindenwold, Clementon (S), Glassboro, Swedesboro.

Pine Barrens.—Landisville, Cedar Brook, Egg Harbor City.

Cape May.—Cape May.

Carex tribuloides Wahl. **Blunt Broom Sedge.**

Pl. XXVI., Fig. 2.

Carex tribuloides Wahlenberg, Koug. Vet. Acad. Handl (II.) 24. 145. 1803 [North America].—Britton 278.—Keller and Brown 87.

Carex lagopodioides Willis 70.

Rather frequent in low ground of the Northern and Middle districts.

Fr.—Early June to late July.

Middle District.—New Egypt, Mt. Holly, Riverside, Medford (S), Mickleton, Swedesboro.

Carex straminea Willd. **Straw Sedge.**

Pl. XXVI., Fig. 3.

Carex straminea "Willd.," Schkuhr Riedgr. Nachtr. 49, f. 34. 1801 [North America].—Knieskern 35.—Willis 70.—Britton 278.

Low ground of the northern counties; less common southward in the Middle district.

Fl.—Late May to early July.

Middle District.—Farmingdale, Mickleton, Riddleton.

Carex silicea Olney. **Sea Beach Sedge.**

Pl. XXVI., Fig. 3.

Carex silicia Olney, Proc. Amer. Acad. VII. 393. 1868 [new name for *C. straminea moniliformis* Tuckerm.].—Keller and Brown 88.

Carex moniliformis Britton 278.

Carex straminea var. *moniliformis* Knieskern 35.—Willis 70.

Frequent along the coast, in moist spots among the sand dunes, etc.

Fr.—Early June to early July.

Maritime.—Deal, Forked River, Seaside Park, Spray Beach (L), Atlantic City, Longport (S), Piermont (S), Stone Harbor, Wildwood, Cape May.

Carex festucacea brevoir (Dewey). **Shorter Fescue Sedge.**

Pl. XXVI, Fig. 8.

Carex brevior Dewey, Am. Jour. Sci. II. 158. 1820 [no loc.].

Occasional in the Cape May district where it was collected by Mr. O. H. Brown. Our specimens were identified by Prof. M. L. Fernald.

Fr.—Late May to early July.*Cape May.*—Cape May (S).**Carex hormathodes** Fernald. **Marsh Straw Sedge.**

Pl. XXVI, Fig. 4.

Carex hormathodes Fernald Rhodora, Aug., 1906, p. 165 [new name for *C. tenera* Dewey, Amer. Jour. Sci. VIII. 97. 1824—no locality].

Carex tenera Keller and Brown 88.*Carex festucacea* var. *tenera* Knieskern.*Carex straminea* var. *foenea* Britton 278.

Frequent along the edge of the salt marshes on the coast.

Fr.—Late May to early July.

Coast Strip.—Pt. Pleasant, Spray Beach (L), Barnegat City Jnc. (L), Palermo, Piermont, Avalon, Holly Beach, Cold Spring.

Carex hormathodes richii Fernald. **Rich's Sedge.**

Carex hormathodes var. *Richii* Fernald, Proc. Amer. Acad. 37. 1901-2. 475 [Mass. and Conn.]

Carex straminea var. *foenea* Britton 278 (as to inland localities).

Occasional in swamps of the Middle district.

Fr.—Late May to early July.*Middle District.*—Delanco, Swedesboro.**Carex alata** Torr. **Broad-winged Sedge.**

Pl. XXVI., Fig. 5.

Carex alata Torrey, Ann. Lyc. N. Y. III. 396. 1836 [Newbern, N. C., Macon, Ga.].—Willis 70.—Keller and Brown 88.

Carex straminea var. *alata* Britton 278.

Rather frequent in the Cape May district, the lower coast islands and lower Middle district.

Fr.—Early June to early July.

Middle District.—New Egypt, Grenloch, Medford (S), Lindenwold (S), Swedesboro.

Coast Strip.—Avalon, Piermont (S), Holly Beach, Wildwood.*Cape May.*—Cold Spring, Cape May.

Carex albolutescens Schw. Greenish-white Sedge.

Pl. XXVI., Fig. 6.

Carex albolutescens Schweinitz, Ann. Lyc. N. Y. I. 66. 1824 [Carolina and Pennsylvania].—Keller and Brown 88.

Frequent throughout our region, least common in the Middle district.

Fr.—Early June into July and sparingly through the summer to as late as October.

Middle District.—Farmingdale, New Egypt, Delanco (S), Riverside, Medford (S), Lawnside (S), Mickleton, Swedesboro, Riddleton.

Pine Barrens.—Lakehurst, Clementon, Landisville (T), Winslow Inc., Egg Harbor City, Tuckerton to Atsion, Speedwell (S).

Coast Strip.—Sandy Hook, Barnegat City (L), Barnegat City Inc. (L), Spray Beach (L), Sherburn's (L), Somers Pt., Stone Harbor, Piermont, Holly Beach (S), Anglesea.

Cape May.—Bennett, Cold Spring, Whitesboro.

Order ARALES.

Inflorescence on a fleshy spadix, often surrounded by a hood-like spathe. Fleshy, water or swamp plants or minute, degenerate floating plants.

Family ARACEÆ. Arums, Etc.

Plants mainly of the Middle district, only one species, the Golden Club, is distinctly a Pine Barren species, while one other, the Arrow Arum, enters the region along the streams.

Key to the Species.

- a. Leaves oblong elliptic, often floating on the water, spadix naked yellow. *Orontium*, p. 317
- aa. Leaves sagittate or hastate, spadix enclosed in a slender green spathe. *Peltandra*, p. 315
- aaa. Leaves large, ovate cordate, spadix in an inflated green and maroon spathe, appearing before the leaves. *Spathyema*, p. 316
- aaaa. Leaves sword shaped, spadix naked from the side of a somewhat three-sided spathe. *Acorus*, p. 317
- aaaaa. Leaves three to many parted, spadix surrounded by a green or purple striped spathe, and with a terminal projection beyond the inflorescence.

- b. Spathe funnel-like, open down the side, clear of the spadix all around, top forming a flap which usually hangs over the tip of the spadix. Leaves three-parted.
- c. Top of spathe always drooping over, inside green or dark purplish or striped. Leaves glaucous beneath. *Arisaema triphyllum*, p. 314
- cc. Top of spathe often erect, always uniform, dark purple within. Leaves not glaucous beneath. Averages much smaller than the preceding. *A. pusillum*, p. 314
- bb. Spadix long attenuate, reaching far beyond the tip of the spathe which is narrow and closely wrapped about it. Leaves 5-15 parted. *A. dracontium*, p. 315

ARISÆMA Martens.

***Arisaema triphyllum* (L.)* Jack-in-the-Pulpit.**

XXXIX., Fig. 2.

Arum triphyllum Linnæus, Sp. Pl. 965. 1753 [Virginia].*Arisaema triphyllum* Knieskern 29.—Willis 58.—Britton 252.

Common in damp woods in the Northern and Middle districts, and locally in the Cape May peninsula.

The familiar Jack-in-the-Pulpit is one of those plants that disappears as soon as we enter the Pine Barrens. In northern and western Jersey we find it in damp woods associated with the Skunk Cabbage, Dog-toothed Violet, Spring Beauty and May Apple, but in the swamps of the Pine region not one of the group is to be found.

Fl.—Late April to mid-May.

Middle District.—Farmingdale, New Egypt, Bordentown, Kinkora, Delanco, Pemberton, Delair, Camden (S), Gloucester (P), Springdale (S), Medford, Washington Park, Woodbury, Sewell (S), Pensauken, Salem (C).

Cape May.—Cold Spring (S), Cape May.

***Arisaema pusillum* Peck. Dwarf Jack-in-the-Pulpit.**

Arisaema pusillum Peck, Rep. N. Y. State Museum, 51. 297. [Millbrook, Dutchess Co., N. Y.].—Stone, Torreya, 1903. 171.—Keller and Brown 89.

This little "Jack" occurs with the preceding, blooming a couple of weeks later. It is easily distinguished by its smaller size, more erect "flap" to the spathe, which is always deep purplish inside, and by the shiny green (not glaucous) under surface to the leaves. It was first noted in our district by Mr. Stewardson Brown at Clementon.

Fl.—Early May to late June.

Middle District.—Farmingdale, Pensauken, Haddonfield (S), Springdale (S), Medford, Pitman, Lindenwold (S), Tomlin (S), Clementon, Sickler-ville (S).

Pine Barrens.—Hammonton (P).

Cape May.—Goshen (S), Cold Spring.

***Arisæma dracontium* (L.). Green Dragon.**

Arum Dracontium Linnæus, Sp. Pl. 964. 1753 [America].

Arisæma dracontium Britton 253.—Keller and Brown 89.

Local in meadows and low woodland in the northern counties and rare in the upper part of the Middle district near the Delaware and in the lower Cape May peninsula.

Fl.—Late May to early June.

Middle District.—Farmingdale, Bordentown (C), Haddonfield (C).

Cape May.—Cold Spring (OHB).

PELTANDRA Rafinesque.

***Peltandra virginica* (L.). Green Arrow Arum.**

Pl. XXVII., Fig. 2.

Arum virginicum Linnæus, Sp. Pl. 966. 1753 [Virginia].

Peltandra virginica Knieskern 29.—Willis 58.—Britton 253.

Plentiful, growing in water along the edges of all the rivers and tributary streams of the State.

Along the muddy shores of the Delaware and the tidewater creeks below Philadelphia its broad arrow-shaped leaves are familiar, mingling with the similar but more delicate ones of the *Sagittaria* and the rounder ones of the big yellow *Splatterdock*, the three forming a sort of border to the beds of Wild Rice and Cat-tails.

The flower, which resembles a very slender green calla lily, raises itself among the leaf stems for a short time, and then, as the seed develops, the stalk curves downward, drawing the pod beneath the water and burying it in the soft mud.

Arrow Arums frequently follow the smaller streams far back toward their sources, and we come upon them sometimes even in the Cedar Swamps of the Pine Barrens where some of these tidewater or river associates have succeeded in penetrating. Mr. Ivar Tidestrom (*Rhodora* 1910. 47) proposes to separate two varieties based on leaf form, but I cannot regard them as any-

thing but individual variations such as occur in *Sagittaria* and other similar plants.

Fl.—Early June to late June.

Middle District.—Farmingdale, New Egypt, Birmingham, Pensauken (S), Sicklerville (S), Camden (P).

Pine Barrens.—Folsom, Pancoast (S), Forks of Batsto.

Coast Strip.—Toms River (NB), Forked River, Manahawkin.

Cape May.—Goshen (S), Court House (S), Bennett.

SPATHYEMA Rafinesque.

Spathyema foetida (L.). Skunk Cabbage.

Pl. XXIX., Fig. 2; Pl. XXX.

Dracontium fatidum Linnæus, Sp. Pl. 967. 1753 [Virginia].

Symplocarpus fatidus Knieskern 30.—Willis 58.—Britton 254.

Frequent in swampy ground, especially in woods, throughout the Northern, Middle and Cape May districts.

As early as February we may find the maroon spathes of the Skunk Cabbage pushing their noses out of the mud in some springhead where the ground is not deeply frozen, sometimes uniformly colored, sometimes streaked with yellowish green, and if we look inside we shall probably find a dust of pollen on the bottom of the chamber, showing that the plant is truly in bloom. It will be some weeks before the leaves begin to show themselves, and by that time the spathes will be pretty well withered or decomposed. Most plants that bloom very early make serious preparation the autumn before, and if we dig up a Skunk Cabbage plant and slit open the base so as to expose the flower bud, we shall find everything in readiness long before winter sets in. A specimen in my collection from Medford, collected October 6, shows the spathe characteristically colored and already four inches high, with spadix half an inch in diameter and flowers fully formed.

The Skunk Cabbage is not found in the Pine Barrens, though inasmuch as the boundary line is irregular, with interlacing arms, there is a narrow strip wherein plants of West Jersey and the Pines grow side by side, which has given rise to the few Pine Barren records. In the Cape May peninsula it reappears, but is apparently absent from the coast strip, as diligent search has failed to detect it between Cape May Court House and Bay Head.

Fl.—February, or more rarely January (depending upon the openness of the winter and the individual habitat) to late March.

Middle District.—Shark River, Farmingdale, Allaire, Pt. Pleasant, Bordentown, Delanco, Delaire, Merchantville, Morristown, Camden (Bassett), Medford (S), Lawnside (S), Woodbury, Sumner, Glassboro, Mickleton (H), Yorktown, Sharpstown, Alloway.

Cape May.—Court House, Dias Creek (S), Cold Spring.

ORONTIUM L.

Orontium aquaticum L. Golden Club.

Orontium aquaticum Linnæus, Sp. Pl. 324. 1753 [Virginia and Canada].—Barton, Fl. Phila. I. 169. 1818.—Knieskern 30.—Willis 59.—Britton 253.—Keller and Brown 89.

Bogs and ponds locally in the Northern and Middle districts, plentiful in the Pine Barrens; casual in the Cape May peninsula.

The Golden Club is one of the attractions of the Pine Barrens in springtime, when the surface of the pools bristle with its brilliant, slender, orange-yellow spikes bordered below with white where they join the green stalks, and later we find the floating leaves with their peculiar velvety upper surface from which the water rolls off as from the proverbial duck's back.

Fl.—Early April to late May.

Middle District.—Delaire, Camden (P), Repaupo (H), Alloway, Woodbury (P).

Pine Barrens.—Manchester (NB), Barnegat, Speedwell (S), Two miles north of Speedwell, Chatsworth, Bear Swamp (S), Albion, Landisville, Pleasant Mills, Forks of Batsto, Folsom, Pancoast.

Cape May.—West of Court House, Cold Spring (OHB).

ACORUS L.

Acorus calamus L. Calamus.

Acorus calamus Linnæus, Sp. Pl. 324. 1753 [Europe].—Knieskern 30.—Willis 59.—Britton 254.

Swamps and wet meadows, frequent in the Northern and Middle districts. Apparently rare elsewhere and perhaps introduced.

Fl.—Early May to early July.

Middle District.—New Egypt, Delaire, Kinkora, Medford (S), Gibbsboro (S), Aura (S), Camden (P), Mickleton (H).

Pine Barrens.—Pleasant Mills (T), Hammonton (Bassett).

Coast Strip.—Beach Haven Terrace (L).

Cape May.—Cold Spring (OHB).

Family LEMNACEÆ. Duckweeds.

Minute floating aquatic plants, consisting of a disc-like or globular thallus, often with thread-like roots below. Growth mostly by lateral branching, the branches soon separating and forming new plants. Flowers rare, consisting of either a single stamen or single pistil, appearing on the upper surface of the thallus. The smallest flowering plants known. Apparently absent from the Pine Barrens.

Key to the Species.

- a. Frond disc-like, 2-8 mm. in diameter.
 - b. Rootlets several, diameter of frond 3-8 mm. *Spirodela polyrhiza*, p. 318
 - bb. Rootlet single.
 - c. Frond round oval, diameter 2-5 mm. *Lemna minor*, p. 318
 - cc. Frond pointed at one end, diameter 2-3 mm. *Lemna perpusilla*, p. 318
- aa. Frond globular, 7-1.5 mm. in diameter. *Wolffia columbiana*, p. 319

SPIRODELA Schleiden.***Spirodela polyrhiza* (L.). Larger Duckweed.**

Limna polyrhiza Linnæus, Sp. Pl. 970. 1753 [Europe].—Willis 59.—Britton 255.

Floating on the water in ponds, ditches, etc. Frequent in the Northern, Middle and Cape May districts.

Middle District.—Fish House, Delair, Medford (S), Mickleton (H).

Cape May.—Green Creek.

LEMNA L.***Lemna minor* L. Smaller Duckweed.**

Lemna minor Linnæus, Sp. Pl. 970. 1753 [Europe].—Willis 59.—Britton 254.

Frequent in the same situations as the last and with the same distribution.

Middle District.—Farmingdale, Fish House, Delair, Blackwood (S).

Cape May.—Cape May.

***Lemna perpusilla* Torr.**

Lemna purpusilla Torrey, Fl. N. Y. II. 245. 1843 [Pond on Staten Island]. Willis 59.—Britton 254.

Similar situations; reported only from the Northern district and from one locality within our range, *i. e.*, "Atlantic City—

Diffenbaugh," given in Dr. Britton's Catalogue. We have been unable to verify this record or to locate the original specimens.

WOLFFIA Horkel.

Wolffia columbiana Karst. **Columbian Wolffia.**

Wolffia columbiana Karsten, Bot. Unters I. 103. 1865-67 [no locality given].
Willis 59.—Britton 255.—Keller and Brown 90.

Middle district, extending to Bergen County.

The little green discs of the Duckweed, with their slender rootlets hanging beneath, reproducing by branching and separation from the parent disc and rarely found blossoming, seem far enough removed from our conception of a flowering plant, but the still more minute *Wolffia* is the extreme in this direction. The plants consist of minute green globules about a millimeter in diameter, which float just below the surface of the water.

Middle District.—Fish House, Kaighns Pt. (C), Bridgeport, Pedricktown (H), Jumbo (H).

Order XYRIDALES.

Monocotyledenous herbs, flowers usually regular, parts in 3's or 6's. Ovary compound, superior. Endosperm of seed mealy.

Family XYRIDACEÆ. Yellow-eyed Grasses.

Characteristic plants of the Pine Barren district. Three of the six species occur sporadically in the Middle and Cape May districts, and one other is restricted to the latter.

The yellow flowers are quite showy, but only last a short time.

XYRIS L.

Key to the Species.

- a. Base distinctly bulbous thickened.
 - b. Lateral sepals projecting beyond the bracts and fringed. *X. arenicola*, p. 322
 - bb. Lateral sepals not projecting beyond the bracts and not fringed.
Bracts tightly imbricated even when ripe, uniform chestnut, heads nearly spherical. *X. torta*, p. 320
- aa. Base not bulbous thickened.
 - b. Lateral sepals projecting beyond the bracts. Plants large, 6-9 dm. high, leaves 20 mm. broad.

- c. Sepals fringed. *X. fimbriata*, p. 322
 cc. Sepals not fringed, but slightly lacerate.
 d. Heads globular or ovoid. *X. congdoni*, p. 320
 dd. Heads cylindrical, twice as long as thick or more.
 X. elata, p. 321
 bb. Lateral sepals not projecting beyond the scales. (This and the last easily distinguished from *torta* by the broad green central part to each scale). Plant smaller, less than 5 dm. high.
 X. caroliniana, p. 321

***Xyris torta* J. E. Smith. Slender Yellow-eyed Grass.**

Xyris torta J. E. Smith, Rees, Cycl. 39 vol. 1819 [North America].
Xyris flexuosa Barton Fl. Phila. I. 25. 1818.—Willis 66.—Britton 247.
Xyris bulbosa Gray Man. Ed. I. 513. 1848.

In swampy spots, locally in the northern counties and common throughout the region covered by this list.

This species is more conspicuously twisted than the equally common *X. caroliniana*, the leaves being frequently spiral. Smith's description certainly applies to this species and not to *X. arenicola* to which his name was so long applied. (cf. Harper, Torrey, 1905, 128).

Fl.—Early July to late August. *Mature Heads.*—Late July persisting into winter.

Middle District.—New Egypt, Florence, Camden, Paulsboro, Lindenwold, Swedesboro, Beaver Dam, Dividing Creek (S).

Pine Barrens.—Long Branch, Belmar (NY), Pt. Pleasant, Toms River (S), Forked River, Seaside Park, Jones Mill (S), Parkdale (S), Pleasant Mills (T), Main Road Sta., Pancoast (NB), Eighth St., Egg Harbor City, Beesley's Pt. (S), Palermo (S), Woodbine.

Coast Strip.—Holgate's (L), Sherburn's (L).

Cape May.—Cape May (S), Town Bank.

***Xyris congdoni* Small. Congdon's Yellow-eyed Grass.**

Xyris congdoni Small, Britton's Manual, 2nd Ed. 1067. 1907 [So. Kingston, R. I.]

Rather frequent in swamps of the Pine Barrens and occasional in the Middle and Cape May districts in isolated bogs. This large species was confused with the smaller *X. caroliniana* in the past. It is closely allied to *X. smallii* of the south, but sufficiently distinct and apparently isolated from it geographically.

Fl.—Mid-June to late August. *Mature Heads.*—Mid-July persisting into October.

Middle District.—Repaupo, Center Square.

Pine Barrens.—Near Williamstown, Woodmansie, Batsto, Bamber, Manahawkin, Pasadena, Chatsworth, Speedwell, Hammonton, Egg Harbor City, Woodbine.

Cape May.—Bennett.

***Xyris elata* Chapm. Chapman's Yellow-eyed Grass.**

Xyris elata Chapman, Fl. So. States. 501. 1860 [W. Florida].

Rare and local, restricted to the lower part of the Cape May peninsula. The very large cylindrical head makes this species conspicuous.

It was first detected in the State by Mr. Chas. S. Williamson.

Dr. John K. Small identifies this plant as *elata* in a letter to Mr. Bayard Long, while specimens from the same spot, which I sent to Dr. B. L. Robinson, are regarded by him as rather aberrant "*X. smalliana*." Judging from the lack of any connecting forms and the marked difference between these and *X. congloni* as it occurs in New Jersey, I am inclined to adopt Dr. Small's view of their relationship.

Fl.—Late July to late September.

Mature Heads.—Late August, persisting into November.

Cape May.—Bennett.

***Xyris caroliniana* Walter. Carolina Yellow-eyed Grass.**

Xyris caroliniana Walter, Fl. Car. 69. 18 [Carolina].

Xyris caroliniana Pursh, Fl. Amer. Sept. I. 33. 1814.—Knieskern 33.—Willis

66.—Gray, Man. Ed. I. 513. 1848.—Britton 247.—Keller and Brown 91.

Xyris brevifolia Barton, Fl. Phila. I. 97. 1818.

Xyris flexuosa var. *pusilla* Britton 247.

Xyris montana Taylor, Torrey 1909, 260.

Frequent throughout the Pine Barren, Middle and Cape May districts.

Easily distinguished from *X. torta* by the absence of a bulbous swelling at the base of the plant. Both species vary in size, and very minute examples, only a few inches high, are responsible for the records of *X. montana*. Mr. Norman Taylor tells me that the Torrey specimens recorded by Dr. Britton and himself and by Mr. Heinrich Ries,* as *montana* (= *pusilla*) are *caro-*

* Bull. Torr. Bot. Club, 19. 38.

liniana, and I have myself examined Dr. Peters' Mays Landing specimens and find them to be the same.

Fl.—Mid-July to early September. *Mature Heads.*—Mid-August persisting into October.

Middle District.—Florence, Delanco (S), Kaighns Pt., Center Square, Repaupo, Tomlin, Washington Park (S), Haddonfield (S), Dividing Creek.

Pine Barrens.—Long Branch, Asbury Park, Pt. Pleasant, Avon, Toms River (NY), Forked River, Waretown, Manchester (NB), Parkdale, Pleasant Mills, Hammonton, Ballengers Mills, Egg Harbor City.

Coast Strip.—Harvey Cedars (L), Spray Beach (L), Ship Bottom (L).

Cape May.—Bennett, Court House.

***Xyris fimbriata* Ell.* Fringed Yellow-eyed Grass.**

Xyris fimbriata Elliot Bot. S. C. and Ga. I. 52. 1816 [Georgia].—Darlington, Fl. Cestrica 12. 1837.—Gray Man. Ed. I. 514. 1848.—Knieskern 33.—Willis 66.—Britton 248.—Keller and Brown 91.

Swamps of the Pine Barrens, apparently not very common.

Fl.—Mid-July to early September. *Mature Heads.*—Mid-August, persisting through September.

Pine Barrens.—Manchester (C), Jones Mill (S), Speedwell, Jackson (P), Hammonton (C), Quaker Bridge, Parkdale, Egg Harbor City, Eighth St.

***Xyris arenicola* Small.† Twisted Yellow-eyed Grass.**

Xyris arenicola Small, Southern Flora, 234 (new name for *X. torta* Kunth nec Smith). [North America.]

Xyris torta Gray, Man. Ed. V. 548. 1867.—Willis 66.—Britton 248.

Xyris conocephala Keller and Brown 91.

Dry sand, Pine Barren region, apparently only once collected in the past, by D. C. Eaton, near Batsto, in 1860. Gray quotes "near Batsto, D. C. Eaton," in the fifth edition of the Manual, and Prof. Fernald writes me that there are two sheets in the Gray Herbarium bearing printed labels "In vicinis Quaker

* C. D. Lippincott's specimen from Repaupo, quoted by Keller and Brown, proves to be *X. congdoni*, and Jahn's record from Paulsboro was doubtless the same, although no specimen was preserved.

† In Britton's catalogue it is recorded from Taunton, on authority of Dr. J. Stokes, and Keller and Brown quote Woodmansie and Forked River (Heritage) and Hammonton (Crawford). There are no specimens to substantiate these records, however, and subsequent search has failed to discover the species at these localities. In view of the frequent misidentification of species of this genus it seems safe to reject them, especially as the three gentlemen responsible for the records concur in this opinion.

Bridge Nov. Caes. coll. D. C. Eaton, 1860," on one of which Eaton has written "Batsto in arenosis." Mr. Norman Taylor writes me that there is a similar sheet in the herbarium of the N. Y. Botanical Garden.

Just as the report is going to press I have the satisfaction of reporting the rediscovery of the plant in New Jersey. On July 19, 1911, Mr. Stewardson Brown, in company with Mr. Bayard Long and the writer, found a patch of this *Xyris* not far from where the Batsto River crosses the New Jersey Central Railroad above Atsion. The plants were growing in sand, not in wet spots, to which the other species are so partial. They were sheathed below, forming the characteristic long bulb-like base. The plants grew several together, the "bulbs" somewhat spirally twisted around one another or arranged in a circle around what had apparently been the location of old plants now dead and rotted away—resembling the base of a tussock. At the date of discovery they were only in bud.

Pine Barrens.—Batsto (Gray Herb. and NY), Atsion.

Family ERIOCAULACEÆ. Pipeworts.

Typical Pine Barren bog plants, two of which reach their northern limit in this region. Parker's Pipewort is restricted to the muddy river shores of the Middle district where it is the representative of the Seven-angled Pipewort of the bogs. It is the only one to occur outside the Pine Barrens and Cape May region.

ERIOCAULON L.

Key to the Species.

- a. Leaves obtuse at the tip, scape 3-9 dm. high. *E. decangulare*, p. 325
- aa. Leaves sharp pointed.
 - b. Heads over 6-12 mm. in diameter, chaff (bracts among the flowers) obtuse, scapes 1.5-9 dm. high, leaves not over 1.2 dm. long. *E. compressum*, p. 324
 - bb. Heads not over 6 mm. in diameter, chaff acute, scapes not over 2 dm. high, usually much less.
 - c. Mature heads 5-9 mm. broad, depressed globose. *E. septangulare*, p. 324
 - cc. Mature heads 3-4 mm. broad, surrounded by a campanulate involucre. *E. parkeri*, p. 324

Flowering Data.—Dates given cover the period when well expanded heads of flowers or of intact fruit occur.

Eriocaulon septangulare With. **Seven-angled Pipewort.**

Pl. XXVIII, Fig. 1.

Eriocaulon septangulare Withering, Bot. Arr. Britt., pl. 784. 1776 [Isle of Skye].—Knieskern 33.—Willis 67.—Britton 260.—Keller and Brown 91.

Eriocaulon pellucidum Pursh Fl. Amer. Sept. I. 92. 1814.

Ponds and bogs of the Pine Barrens and locally in lakes of the northern counties.

This species is subject to great variation in size and character of foliage according to habitat. In submerged specimens the leaves become well developed, nearly or quite a foot (3 dm.), with scapes about as long. In others the leaves are only half the length of the scape, while plants on the edge of a pond or bog are often only 75–100 mm. in height, with leaves 25–25 mm. long, exceedingly dwarfed specimens reaching a height of only 25–50 mm. *E. decangulare* never develops the long floating leaves of *E. septangulare*, and so far as I can ascertain *E. compressum* does not do so either.

Fl.—Early July to early October.

Pine Barrens.—Pt. Pleasant (Mackenzie), Manchester (NY), Bamber, Toms River (S), Island Hts. Inc. (NY), Waretown, Speedwell (S), Clementon, Hammonton (NB), Twelfth St. Folsom, Egg Harbor City, Absecon.

Eriocaulon parkeri Robinson. **Parker's Pipewort.**

Eriocaulon Parkeri Robinson, Rhodora V. 175. 1905 [Camden].—Keller and Brown 92.—Long, Bartonis II. 20. 1910.

Tidewater mud banks of western New Jersey, local. First recognized by Dr. Robinson as distinct from the last and described from a specimen collected at the mouth of Cooper's Creek on the Delaware, by the late Chas. F. Parker (1820–1883), one of the best informed botanists on the Pine Barrens of New Jersey.*

Fl.—Late July, into October or November.

Middle District.—Bordentown, Morris, Fish House, Camden ab. Cooper's Creek, Red Bank, Millville.

Coast.—Mullica River above Crowleytown.

Eriocaulon compressum Lam. **Flattened Pipewort.**

Pl. LXIV., Fig. 2.

Eriocaulon compressum Lamarck, Encycl. III. 276. 1879 [So. Carolina].—Keller and Brown 92.

* Cf. Proc. Acad. Nat. Sci., Phila., 1883, p. 260, for biography.

Eriocaulon gnaphalodes Willis 67.—Gray Man. Ed. II. 489. 1858.—Britton 259.

Wet swamps in the Pine Barrens and Cape May district; frequent.

The early flowering, large grayish heads and short leaves distinguish this fine species from the preceding, while *E. septangulare* is usually smaller and later in flowering.

Fl.—Mid-May to late June, rarely into July.

Pine Barrens.—Toms River, Forked River, Speedwell, Berlin, Jackson, Eighth St. (NY), Hammonton (Bassett), Quaker Bridge, Pleasant Mills (S), Pancoast, Manumuskín (S), Franklinville (P), Atsion (P), Elmer (P), Egg Harbor City (P)

Cape May.—Bennett.

***Eriocaulon decangulare* L. Ten-angled Pipewort.**

Pl. XXVIII., Fig. 2.

Eriocaulon decangulare Linnæus, Sp. Pl. 87. 1753 [North America].—Pursh Flor. Amer. Sept. I. 91. 1814.—Gray Man. Ed. I. 515. 1848.—Knieskern 33.—Willis 67.—Britton 259.—Keller and Brown 92.

Pine Barren swamps, the most plentiful species, extending to the edge of the salt meadows at certain points, and also to the Cape May district.

Fl.—Mid-July to early October.

Pine Barrens.—Toms River, Montclair (NB), Toms River (NY), Forked River (NB), Island Hts., West Creek, Tuckerton, Jones Mill (S), Speedwell (S), High Bridge (S), Bear Swamp (S), Berlin (KB), Atco, Cedar Brook, Hammonton, Atsion, Landisville (NY), Parkdale (S), Quaker Bridge, Batsto (S), Forks of Batsto, Egg Harbor City, Folsom Twelfth St., Eighth St. (T), Mays Landing (H), Weymouth (NY), Beesleys Pt. (H), Manumuskín (S), Ocean View (S), Bel. Palermo, Dennisville (OHB).

Cape May.—Dias Creek.

Family COMMELINACEÆ. Spiderworts.

Key to the Species.

- a. Perfect stamens, 3, rarely 2, bracts spathe-like.
 - b. Margins of spathe united. *Cammelina hirtella*, p. 326
 - bb. Margins of spathe free, flowers blue. *C. communis*, p. 326
- aa. Perfect stamens, 6, rarely 5, bracts leaf-like *Tradescantia*, p. 325

TRADESCANTIA L.

***Tradescantia virginiana* L. Spiderwort.**

Tradescantia virginiana Linnæus, Sp. Pl. 288. 1753 [Virginia].—Knieskern 33.—Britton 248.

Perhaps native along the upper Delaware in the Middle district, but for the most part, if not entirely, an escape from cultivation.

Fl.—Late May to mid-June.

Middle District.—New Egypt, Bordentown (C), Swedesboro (C), Salem (C).

COMMELINA L.

Commelina communis L. Common Spiderwort.

Commelina communis Linnæus, Sp. Pl. I. 40. 1753 [America].

Frequent in the Northern and Middle districts, and locally on the coast; largely if not entirely introduced as a weed.

All alleged records of *C. virginica* from our district prove to be this.

Fl.—Early August to late September.

Middle District.—Beverly (C), Kinkora (NY), Fish House, Merchantville (C), Moorestown (C), Kaighns Pt., Haddonfield (S), Oaklyn (S), Lawnside (S), Woodbury (C), Pennsgrove (C).

Coast Strip.—Beach Haven (L), Atlantic City (NB), Pleasantville (NY).

Commelina hirtella Vahl.

Commelina hirtella Vahl., Enumerat. 2. 166. 1806 [new name for *C. longifolia* Mich., nec Lam.—Virginia].

Very rare in the Middle district. Collected by Chas. E. Smith at Kaighns Point many years ago.

Middle District.—Kaighns Pt.

Family PONTEDERIACEÆ. Pickerel Weeds, etc.

Several water plants of very dissimilar general appearance belong here. They all agree in having six-parted flowers, which grow singly or several to many together in a sheath or spathe, which is leaf-like, often covering only the base of the spike.

Only the Pickerel Weed enters the Pine Barrens.

Key to the Species.

a. Leaves ovate, cordate sagittate, flowers in an exposed spike, blue.

Pontederia, p. 327

aa. Leaves uniform, flowers inconspicuous, whitish or bluish.

Heteranthera reniformis, p. 327

aaa. Leaves floating, grass-like; flowers star-like, yellow. *H. dubia*, p. 327

PONTEDERIA L.

Pontederia cordata L. Pickerel Weed.

Pl. XXVII., fig. I.

Pontederia cordata Linnæus, Sp. Pl. 288. 1753 [Virginia].—Knieskern 33.—Willis 66.—Britton 246.

Frequent in water along streams throughout the State, extending well back into the heart of the Pine Barrens. The variety *angustifolia* Pursh seems to be merely an extreme leaf from such as we find in *Sagittaria* and other aquatic plants.

Fl.—Late June to mid-September.*Middle District.*—Pensauken (S), Hartford, Fish House, Medford (S), Salem (S), Centerton (S), Franklinville (P).*Pine Barrens.*—Toms River (S), Speedwell (S), Pleasant Mills, Quaker Bridge (C), Hammonton (Bassett), Eighth St., Manumuskin (S).*Cape May.*—Timber and Beaver Creek (S), Cape May.

HETERANTHERA Ruiz and Pavon.

Heteranthera reniformis Ruiz & Pavon. Mud Plantain.*Heteranthera reniformis* Ruiz and Pavon, Fl. Per. I. 43. 1798 [Cercado, Peru].—Barton Fl. Phila. I. 23. 1818.—Willis 66.—Britton 247.

Northern and Middle districts on muddy river banks and borders of ponds and ditches, frequent. In our area reported only from the shores of the Delaware.

Fl.—Early July into September.*Middle District.*—Bordentown, Delair, Kaighns Pt., Bridgeport (NB), Salem Co. (C).*Heteranthera dubia* (Jacq.). Water Star Grass.*Commelina dubia* Jacquin, Obs. Bot. II. 9, pl. 59. 1768 [Virginia].—Britton 247.

Streams and lakes of the Northern district, rarely in the Delaware within our limits.

Fl.—Late July into September.*Middle District.*—Delaware River, Camden Co. (NB).

Order LILIALES.

Differs from the previous order in having the endosperm of the seed fleshy or horny.

Family JUNCACEÆ. Rushes.

Grass-like plants often popularly confused with the sedges, but easily distinguished by the fact that they have perfect flowers with three acute stiff petals and three similar sepals which persist around the nearly spherical or cylindrical seed capsule. Seeds abundant, very minute (spore like), often with an elongated "tail" at each end. Common mostly in damp ground or in water throughout our region.

Flowering or Fruiting Data.—The time of year noted indicates the season when the capsules are full-grown (but not necessarily mature), through the period of dehiscence (*i. e.*, as long as there are present undehiscent capsules).

Key to the Species.

- a. Plant not hairy, leaf sheaths open.
 - b. Inflorescence apparently growing from the side of the scape, not from the end (the part above the inflorescence is really the involucreal leaf which is terete and appears exactly like a continuation of the scape).
 - c. Sheaths at base of the scape leafless. *Juncus effusus*, p. 329
 - cc. Sheaths, or at least the inner one, bearing long terete scape-like leaves. *J. setaceus*, p. 332
 - bb. Inflorescence obviously terminal.
 - c. Leaves flat or somewhat terete, never septate.
 - d. Flowers inserted singly on the branches of the inflorescence, each with a small bract.
 - e. Annual, root fibrous, inflorescence more than one-third the height of the plant. *J. bufonius*, p. 330
 - cc. Perennial, from a root-stock, inflorescence not one-third the height of the plant.
 - f. Leaves flat or somewhat involute in drying.
 - g. Cauline leaves 1-2, perianth parts obtuse, salt meadow species. *J. gerardi*, p. 330
 - gg. Cauline leaves none, perianth parts acute, inland species. *J. tenuis*, p. 331

- ff. Leaves terete, channeled along the upper surface.
 - g. Capsule not longer than the perianth. *J. dichotomus*, p. 331
 - gg. Capsule distinctly longer than the perianth. *J. greenii*, p. 331
- dd. Flowers without individual bracts, collected in heads, leaves flat.
 - e. Stamens exserted in fruit, plant 4-10 dm. high. *J. aristulatus*, p. 332
 - ee. Stamens not exserted in fruit, plant 2-7 dm. high.
 - f. Perianth plainly exceeded by the capsule. *J. greenii*, p. 331
 - ff. Perianth not exceeded by the capsule. *J. marginatus*, p. 332
- cc. Leaf-blade hollow terete, and provided with septa at regular intervals.
 - d. Stamens six, one opposite each part of the perianth.
 - e. Heads containing 1 or rarely 2 flowers. *J. pelocarpus*, p. 333
 - ee. Heads containing 2 to many flowers.
 - f. Epidermis rough with minute tubercles. *J. cæsariensis*, p. 334
 - ff. Epidermis smooth.
 - g. Plants with submerged capillary leaves in addition to the normal ones. *J. militaris*, p. 333
 - gg. Plants without capillary leaves. *J. articulatus*, p. 334
 - dd. Stamens three.
 - e. Capsule obtuse or acute, not subulate pointed. *J. canadensis*, p. 335
 - f. Seeds large, 1-1.8 mm. long.
 - ff. Seeds 0.4-0.5 mm. long.
 - g. Tip of capsule exceeding the calyx. *J. debilis*, p. 335
 - gg. Capsule shorter than the calyx. *J. acuminatus*, p. 336
 - ee. Capsule tapering to a slender subulate point. *J. scripoides*, p. 335
 - aa. Plant somewhat hairy, leaf sheaths closed. *Juncoides campestre*, p. 336

JUNCUS L.

Juncus effusus L. Common Rush.

Pl. XXXI., Fig. 4.

Juncus effusus Linnæus, Sp. Pl. 326. 1753 [Europe].—Knieskern 33.—Willis 65.—Britton 249.

Juncus conglomeratus Barton, Fl. Phila. I. 170. 1818.—Britton 249.

Common in swamps throughout the State.

This is probably the most familiar species of *Juncus*, easily distinguished from the other common species by its lateral, more or less congested, inflorescence.

Full-grown Capsules.—Mid-June to mid-July.

330 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—Farmingdale, Haddonfield (C), Medford (S), Camden (P), Union Grove (S), Yorktown.

Pine Barrens.—Landisville (T), Winslow Jnc., Folsom, Atsion (NB), Egg Harbor City.

Coast Strip.—Seaside Park (HA), Barnegat City* (L), Beach Haven Terrace* (L).

Juncus bufonius L.† **Toad Rush.**

Pl. XXXI., Fig. 2.

Juncus bufonius Linnæus, Sp. Pl. 328. 1753 [Europe].—Knieskern 33.—Willis 66.—Britton 249.

In moist places throughout the State except in the Pines.

Full-grown Capsules.—Late May into July.

Middle District.—Medford (S), Mickleton (H).

Coast Strip.—Atlantic City, Piermont (S), Spray Beach (L).

Cape May.—Cape May, Cape May Pt. (S).

Juncus gerardi Lois. **Black Grass.**

Pl. XXXI., Fig. 3.

Juncus Gerardi Loiseleur Deslongchamps, Journ. de Bot. II. 284. 1809.

[Provence, France].—Willis 66.—Britton 249.—Keller and Brown 95.

Juncus bulbosus Gray Man. Ed. II. 483. 1858.

Salt marshes, abundant.

Full-grown Capsules.—Mid-June to mid-July.

Maritime.—Seaside Park (Hor), Pt. Pleasant, Barnegat City Jnc. (L), Spray Beach (L), Peahala (L), Atlantic City (NB), Ocean City (S), Estelville (T), Piermont (S), Cold Spring (S).

† These specimens have been identified by Prof. Fernald and Mr. Wiegand as var. *solutus* and one from Egg Harbor City as var. *conglomeratus*.

† We can find no New Jersey specimens of *J. maritimus* or *J. roemerianus*, and their inclusion in the New Jersey flora seems to rest wholly upon a statement of Pursh (Fl. Amer. Sept. I. 235. 1814). He gives "*Juncus acutus* on the sandy seacoast New Jersey, &c." In the first edition of Gray's Manual this record is quoted under *Juncus maritimus*, while in the fifth edition and earlier in Trans. St. Louis Acad. II. 439, 1866, Engelm. shows that the *J. maritimus* of American authors is really *J. roemerianus*, which he continues to cite from New Jersey. Prof. M. L. Fernald, who corroborates the above, also calls my attention to this statement by Engelm. (Trans. St. Louis Acad. II. 490)—"The New Jersey locality rests on the doubtful authority of Pursh; I have seen no specimens collected farther north than Wilmington, N. C." As no one has found it in the State subsequently, I think we may safely expunge it from the list.

Juncus tenuis Willd. **Slender Rush.**

Pl. XXXI., Fig. 1.

Juncus tenuis Willdenow, Sp. Pl. II. 214. 1799 [North America].—Willis 66.—Britton 250.

Plentiful throughout, usually in low shady ground, except in the Pine Barrens, where it apparently does not occur except rarely as a weed.

Full-grown Capsules.—Mid-May to mid-July.

Middle District.—Allaire (NY), Farmingdale (NY), Ortley (NY), Lawnside (S), Albion, Yorktown (S).

Pine Barrens.—Landisville (T).

Coast Strip.—Manahawkin, Spray Beach (L), West Creek, Palermo (S).

Cape May.—Bennett (S).

Juncus greenei Oakes and Tuckerm. **Greene's Rush.**

Juncus Greenei Oakes and Tuckerman, Amer. Jour. Sci. 45. 37. 1843 [Tewkesbury, Mass.].

Reported from Middlesex and Sussex Counties in Britton's Catalogue, and collected at New Egypt by Mr. Norman Taylor, August 23, 1910.

Middlesex District.—New Egypt (NY).

Juncus dichotomus Ell.* **Forked Rush.**

Pl. XXXI., Fig. 7.

Juncus dichotomus Elliott, Bot. S. C. and Ga. I. 406. 1817 [prob. S. C.] Willis 66.—Britton 250.—Keller and Brown 95.

Plentiful throughout our range in moist sandy ground, not reported from the northern counties.

Full-grown Capsules.—Late June to late July.

Middle District.—Farmingdale, Timber Creek (KB), Haddonfield (P), Medford (S), Lindenwold, Sicklerville (S), Swedesboro, Yorktown (S), Elmer (P).

Pine Barrens.—Toms River (NY), Forked River, Speedwell, Chatsworth (S), Atsion, Quaker Bridge, Landisville, Spring Garden (P), Dennisville (P).

* *Juncus secundus* "Beauv." (Poiret Encycl. Sup. III. 160. 1813), is reported from one station in Warren Co., and given in Britton's Catalogue on authority of C. F. Parker as occurring in Gloucester Co. Parker's specimen is preserved in his herbarium at Princeton and is labeled "*J. tenuis* approaching *secundus*," which seems to be a very proper disposal of it.

Coast Strip.—Sandy Hook (NB), Seabright, Sherburn's (L), Atlantic City (P), Stone Harbor, Holly Beach (KB).

Cape May.—Court House (S), Cape May.

***Juncus setaceus* Rostk. Awl-leaved Rush.**

Pl. XXXI., Fig. 8.

Juncus setaceus Rostkovius, Diss. Junc. 13, pl. 1, f. 2. 1801 [Pennsylvania (=N. J.?).—Stone, Proc. Acad. Nat. Sci. Phila. 1908. 458.

Moist ground in the Cape May district; frequent.

An unidentified specimen collected by Mr. Jos. Crawford in Cape May Co., July 15, 1892, was found by the writer in the herbarium of the Philadelphia Academy, and subsequent field work showed it to be of frequent occurrence, though local.

Full-grown Capsules.—Mid-July into Autumn or even winter.

Cape May.—Court House, Cold Spring (OHB), Cape May.

***Juncus marginatus* Rostk. Grass-leaved Rush.**

Pl. XXXI., Fig. 5.

Juncus marginatus Rostkovius, Diss. Junc. 38, pl. 2, f. 3. 1801 [Pennsylvania].—Willis 65.—Britton 249.

Juncus marginatus var. *paucicapitatus* Engelm., Tr. St. Louis Acad. II. 455. 1868.—Britton 249.

Common in open moist ground in the Northern and Middle districts, less frequent elsewhere.

Full-grown Capsules.—Late June to late July.

Middle District.—Hornerstown, Pemberton Inc. (S), Medford, Woodbury, Beaver Dam.

Pine Barrens.—Lakehurst, Chatsworth, Pleasant Mills (T), Landisville, Pancoast (S).

Coast Strip.—Waretown, Spray Beach (L), West Creek (CM), Court House (S), Cape May (S).

***Juncus aristulatus* Michx. Bristly Rush.**

Pl. XXXI., Fig. 6.

Juncus aristulatus Michaux, Fl. Bor. Am. I. 192. 1803 [Georgia and Carolina].

Juncus marginatus aristulatus Keller and Brown 95.

Juncus marginatus var. *biflorus* Britton 249.

Plentiful in bogs and swamps of the Pine Barrens and Cape May district, extending out frequently to the edge of the salt marshes and on the coast islands.

Full-grown Capsules.—Early July to early August.

Pine Barrens.—Pt. Pleasant (S), Hanover, Bamber, Forked River, Pasadena (NB), Landisville, Atsion, Parkdale (S), Hammonton, Folsom, Egg Harbor City (P), Woodbine (S), Dennisville.

Coast Strip.—Sea Bright (NB), Deal, Waretown, Manahawkin, West Creek (S), N. Beach Haven (L), Holgate (L), Atlantic City (C), Absecon (S), Ocean City (S), Palermo (S), Beaver Dam.

Cape May.—Court House, Whitesboro (S), Cold Spring, Bennett, Cape May.

***Juncus pelocarpus* E. Meyer. Proliferous Rush.**

Pl. XXXII., Fig. 6.

Juncus pelocarpus E. Meyer, Syn. Luz. 30 [Massachusetts].—Willis 66.—Britton 250.—Keller and Brown 96.

Juncus conradi Tuckermann, Torrey Fl. N. Y. II. 328.

Rare and local in the Northern and Middle districts and plentiful in Cedar Swamps and bogs of the Pine Barrens and Cape May peninsula.

Full-grown Capsules.—Late August to late September; good mature capsules with seeds quite rare, flowers frequently proliferous.

Middle District.—Crosswicks, Delanco (S), Center Sq. (H).

Pine Barrens.—Pt. Pleasant, Lakehurst (NB), Toms River (S), Pasadena, West Creek, Speedwell (S), Berlin, Jackson, Landisville (T), Hammonton (S), opp. Crowleystown, Egg Harbor City, Pancoast, Weymouth (T), Mays Landing (S), Absecon (S), Tuckahoe (S), Palermo, Dennisville (S).

Coast Strip.—Harvey Cedars (L), N. Beach Haven (L), Ship Bottom (L), Sherburn's (L), Brant Beach (L).

Cape May.—Dias Creek (S).

***Juncus militaris* Bigel. Bayonet Rush.**

Pl. XXXII., Fig. 4.

Juncus militaris Bigelow, Fl. Bost. Ed. II. 139. 1824 [Tewksbury, Mass.].—Knieskern 33.—Willis 66.—Englemann Trans. St. Louis Acad. II. 460. 1868.—Gray Man. Ed. I. 1848.

Common in the streams of the Pine Barrens, and rare and local in the northern counties. This species is especially interesting from the curious submersed thread-like leaves that grow from the root stalk and which are spread out in the current like masses of waving hair.

In a dam at Fairton, Cumberland Co., I found long non-fruiting stems of a *Juncus* growing in deep water, which I have no doubt belonged to this species, probably washed down from the Pine Barrens of the interior.

Full-grown Capsules.—Late July or August (apparently). Good mature capsules with seeds apparently very rare.

Pine Barrens.—Manchester (P), Toms River, Pasadena, Speedwell, Chatsworth, Cedar Lake (T), Quaker Bridge (NB), Atsion, Twelfth St. (T), Weymouth (T), Mays Landing (NB).*

Cape May.—Seaville (C).

***Juncus articulatus* L. Jointed Rush.**

Juncus articulatus Linnæus, Sp. Pl. 327. 1753 [Europe].—Britton 250.—Keller and Brown 96.

Along the edge of the salt marsh on the coastal islands and the mainland, apparently rather frequent.

Full-grown Capsules.—Mid-June to early August.

Coast Strip.—Ortley (NY), Mantoloking (NY), Forked River, Barnegat City Inc. (L), Beach Haven (L), Spray Beach (L), Ocean City, Palermo, Piermont (S), Cold Spring.

***Juncus cæsariensis* Coville. New Jersey Rush.**

Pl. XXXII., Fig. 5.

Juncus cæsariensis Coville, Mem. Torr. Bot. Club V. 106. 1894 [new name for *J. asper* Engelm., Quaker Bridge, N. J.].—Keller and Brown 96.

Juncus asper Engelmann Trans. St. Louis Acad. II. 478. 1868.—Willis 66.—Britton 251.

Bogs and cedar swamps of the Pine Barrens and formerly at one station in western New Jersey. Not known to grow outside of the State.

This, our only rough-stemmed *Juncus*, is characteristic of deep cedar swamps mainly on the eastern side of the Pine Barrens. It was first discovered by Dr. Pickering, near Quaker Bridge. The occurrence at Griffith's Swamp (locality now destroyed) is one of the most striking illustrations of isolated colonies of Pine Barren plants in the Middle district.

Full-grown Capsules.—Late August into October.

Middle District.—Griffith's Swamp.

Pine Barrens.—Toms River (NY), Bamber, Forked River, Dover Forge, Waretown, Chatsworth, Quaker Bridge, Batsto, Forks of Batsto, Pancoast, near Landisville (NY).

*The record for Stafford Forge attributed to the writer in Keller and Brown's list was an error, and I have no specimens from there, though it probably occurs in the vicinity. Mr. C. D. Lippincott tells me that the same is true of the Browns Mills record attributed to him.

Juncus scirpoides Lam. **Scirpus-like Rush.**

Pl. XXXII., Fig. 3.

Juncus scirpoides Lamarck, Encycl. Meth. Bot. III. 267. 1789 [South Carolina.—Knieskern 33.—Willis 66.—Englemann Tr. St. L. Acad. II. 467. 1868.—Britton 251.—Keller and Brown 96.

Juncus scirpoides var. *macrostylus* Englemann Tr. St. L. Acad. II. 463. 1868.

Rare northward and in the Pine Barrens, but common in swampy ground elsewhere.

Full-grown Capsules.—Late August to late September or early October.

Middle District.—Farmingdale, Haddonfield (S), Lindenwold, Mickleton (H), Swedesboro (KB), Centerton (S), Dividing Creek.

Pine Barrens.—Bamber, Landisville (T), Hammonton (T), Mays Landing (S).

Coast Strip.—Pt. Pleasant, Spray Beach (L), So. Atlantic City (P), Ocean City (S), Piermont (S), Wildwood (NY).

Cape May.—Dennis (S), Bennett, Cold Spring, Cape May (S).

Juncus canadensis J. Gay. **Canada Rush.**

Pl. XXXII., Fig. 2.

J[uncus] Canadensis "J. Gay," Laharpe, Mem. Soc. Hist. Nat. Paris III. 134. 1827 [Canada].—Britton 251.—Keller and Brown 96.

Juncus Canadensis longicaudatus Willis 66.

Swamps, common throughout the State.

Full-grown Capsules.—Late August into October. .

Middle District.—New Egypt, Florence, Delanco, Hartford, Westmont (S), Lawnside, Griffith's Swamp, Lindenwold, Medford, Tomlin, Clarksboro, Swedesboro, Dividing Creek.

Pine Barrens.—Clementon, Weekstown, Whitings (NY), Pleasant Mills, Quaker Bridge, Landisville, Ocean City Inc.

Coast Strip.—Deal, Pt. Pleasant, Forked River, Toms River (NY), Waretown, Barnegat City (L), Ship Bottom (L), Surf City (L), Spray Beach (L), Absecon (S), Ocean City, Palermo, C. M. Court House, Holly Beach, Cold Spring.

Cape May.—Two mi. W. of Ct. House (S), Sluice Creek (S).

Juncus canadensis subcaudatus Engelm.

Juncus Canadensis subcaudatus Engelm., Trans. St. L. Acad. II. 474. 1868 [Connecticut to Georgia, incl. New Jersey].—Britton 251.—Keller and Brown 96.

Landisville (Gross) and Camden (Parker). Specimens in Gross' collection seem to be *J. debilis*, but possibly the label has

been misplaced. Parker's specimens are at Princeton and appear to be this form, but I have not examined them critically.

Middle District.—Red Bank (NY), identified by Dr. Britton.

***Juncus acuminatus* Michx. Sharp-fruited Rush.**

Pl. XXXII., Fig. 1.

Juncus acuminatus Michaux, Fl. Bor. Am. I. 192. 1803 [South Carolina].—Britton 250.—Keller and Brown 96.

Swamps, rather frequent throughout, apparently least common in the Pine Barrens.

Full-grown Capsules.—Early June to late June, rarely sporadically through the summer.

Middle District.—New Egypt, Andrew's, Glassboro (S), Centerton (S), Riddleton, Swedesboro, Griffith's Swamp (P).

Pine Barrens.—Landisville, Winslow Jnc. (S), Spring Garden (P), Malaga (P).

Coast Strip.—Pt. Pleasant (NB), Surf City (L), Beach Haven Terrace (L), Spray Beach (L), West Creek, Holly Beach, C. M. Court House (S), Cold Spring, Cape May.

***Juncus debilis* Gray. Weak Rush.**

Juncus debilis Gray Man. 506. 1848 ("southward" and "westward").

Juncus acuminatus var. *debilis* Willis 66.—Englemann Tr. St. L. Acad. II. 463. 1868.—Britton 250.—Keller and Brown 96.

Rather frequent in the Pine Barren and Cape May districts and rare in the Middle district.

Full-grown Capsules.—Mid-June into September.

Middle District.—Haddonfield, Griffith's Swp., Riddleton, Haleyville (P).

Pine Barrens.—Double Trouble, Manahawkin, Tuckerton, Pancoastville (T), Atsion (P), Egg Harbor City, Mays Landing, Palermo, Dennisville.

Cape May.—Whitesboro, Bennett.*

JUNCOIDES Adanson.

***Juncoides campestris* (L.). Wood Rush.**

Juncus campestris Linnæus, Sp. Pl. 329. 1753 [Europe].

Luzula campestris Knieskern 33.—Britton 251.

Common in woods in the Northern and upper Middle districts and occasional on the coastal strip.

Fl.—Late April to early May. *Fr.*—Mid-May to late May.

* The records in Keller and Brown for Center Square and Atsion prove to be *J. plocarpus*, that for Brown's Mills remains unverified.

Middle District.—Freehold (NY), Farmingdale, New Egypt, Bordentown, Kinkora, Delanco, Delaire, Birmingham, Moorestown, Medford (S), Camden (Basset), Wenonah, Sewell (S), Glassboro, Mickleton, Quinton.

Coast Strip.—Pt. Pleasant (S), Barnegat City (L), Barnegat City Jnc. (L), Palermo, Cold Spring.

Family MELANTHACEÆ. Bunch-flowers, etc.

Plants of diverse appearance, differing from the Rushes in having the petals at least (often the sepals, too) conspicuous and colored. Fruit, a capsule which splits longitudinally. Plants rarely bulbous.

Key to the Species.

- a. Flowers numerous in terminal, erect, spike-like racemes or panicles.
 - b. Flowers yellow, with erect bracts, somewhat resembling a head of wheat, in fruit. *Abama*, p. 338
 - bb. Flowers lilac, stamens blue. *Helonias*, p. 340
 - bbb. Flowers white, inflorescence in a narrow raceme.
 - c. Leaves very narrow, grass-like and harsh. *Xerophyllum*, p. 339
 - cc. Leaves linear, lanceolate or spatulate, smooth.
 - d. Raceme 7-20 cm. long, flowers dioecious. *Chamaelirium*, p. 341
 - dd. Raceme 2-12 cm. long, flowers perfect.
 - e. Stem viscid pubescent. *Tofieldia*, p. 337
 - ee. Stem glabrous. *Chrosperma*, p. 341
 - bbbb. Flowers green, inflorescence in an open panicle.
 - c. Plant glabrous, leaves linear. *Zigadensus*, p. 342
 - cc. Plant pubescent.
 - d. Leaves linear. *Melanthium*, p. 342
 - dd. Leaves oval or elliptic. *Veratrum*, p. 343
- aa. Flowers solitary, terminal, pendant yellow.
 - bb. Leaves perfoliate. *Uvularia perfoliata*, p. 343
 - bb. Leaves not perfoliate.
 - c. Under surface glaucous. *U. sessilifolia*, p. 343
 - cc. Under surface green, shining. *U. nitida*, p. 343

TOFIELDIA Hudson.

Tofieldia racemosa (Walt.). Viscid Asphodel.

Pl. XXXIII., Fig. 1.

Melanthium racemosum Walter, Fl. Cor. 126. 1788 [probably Santee River, S. C.].

Tofieldia pubens Knieskern 32.—Willis 64.

Tofieldia racemosa Britton 244.—Saunders, Proc. Acad. Nat. Sci. Phila., 1900, 545.—Stone *do.* 1908. 459.

Bogs in the heart of the Pine Barrens, local. This plant is limited to the same area that the *Abama* inhabits, but is much rarer. It was originally discovered in the State by Dr. P. D. Knieskern at Manchester [= Lakehurst]. The older botanists, as well as Canby, A. H. and C. E. Smith, who were familiar with the *Abama*, never found the *Tofieldia*, and curiously enough Knieskern apparently never succeeded in finding the former.

After forty years the plant had not been found again, and Dr. Britton could only quote Knieskern's record. On July 4, 1899, however, Mr. C. F. Saunders collected it between Tuckerton and Atsion on a savanna near Symmes' Place.

On July 4, 1904, after reading Mr. Saunders' account, Mr. H. L. Coggins and I visited a spot near High Bridge, over the Wading River, where I thought conditions were favorable to its growth, and sure enough the minute we entered on the flat savanna land bordering the river, the white spikes of starry flowers, like miniature Turkey-beard, were seen on either hand, their heads reaching just above the grass and sedge. The following day, below Speedwell, we found it again, and on Pole Branch that afternoon a great patch of it was found mingled with the yellow spikes of the *Abama*, a truly wonderful sight, and not content with the sandy bog, individual plants had established themselves in damp spots in the middle of the old road, as if they knew that they had little to fear from passing traffic.

Fl.—Late June to mid-July.

Pine Barrens.—Manchester (C), Symmes' Place, High Bridge (S), Speedwell, below Chatsworth, Pole Branch.

ABAMA Adanson.

Abama americana (Ker.). Bog Asphodel.

Pl. XXXIII, Figs. 2, 3.

Narthecium americanum Ker., Bot. Mag. pl. 1505. 1812 [Quaker Bridge, N. J.].—Pursh, Fl. Amer. Sept. I. 227. 1814.—Torrey, Cat. N. Y. Plants, 35.—Torrey, Fl. U. S. I. 347.—Britton 243.

Narthecium ossifragum var. *americanum* Willis 65.

Abama americana Keller and Brown 97.—Saunders, Proc. Acad. Nat. Sci. Phila.

Locally common in bogs in the heart of the Pine Barrens.

This remarkable plant was discovered by Frederick Pursh (1774-1820),* one of the first botanists to publish on the Pine Barren flora, on one of his excursions in the swamps about Quaker Bridge. At the time Dr. Britton's Catalogue was published, seventy-five years later, there were but five stations known where it grew, while to-day I have seen specimens from only a dozen, all of which lie between Tom's River on the north and Atsion and Pleasant Mills on the south, mostly east of the New Jersey Southern Railroad—roughly speaking an area twenty by thirty miles. This has been supposed to be the only spot in the world where the plant occurs, but in the Commons herbarium at the Academy of Natural Sciences, Philadelphia, there are specimens of both *Abama* and *Tofieldia* from near Lewes, Delaware, collected by Mr. Albert Commons, August 1 and 15, 1895, respectively. Probably some of the older localities are now extinct, as the *Abama* is one of those plants which are exterminated by cranberry culture. The damming and flooding of the bogs covers the low wet sandy spots frequented by the plant and it disappears—at least I have never been able to find it on the edges of cultivated bogs. On the branches of the Wading River about Chatsworth and Speedwell, where broad, wet sandy bogs abound, I have seen great patches of *Abama*, the short stiff leaves curving up from the root stalks in thick ranks like short grass, and the yellow spikes standing close together make a golden sheen over the bog that can be seen at quite a distance. Even when in fruit they make quite a show, the seed capsules being rich reddish brown and the stalks and bracts buff like wheat chaff.

Fl.—Mid-June to late July.

Pine Barrens.—Toms River, Ostrom (NY), Forked River, Pasadena, Jones Mill (S), Pole Branch (S), Speedwell, Chatsworth, Atsion, Quaker Bridge, Batsto (C), opposite Crowleytown, below Batsto, Mullica River (same as last?), Pleasant Mills.†

* Bot. Gazette VII., 141.

† The record at Barnegat quoted by Keller and Brown, from Britton's catalogue, is not in the catalogue, and it was apparently entirely erroneous. The Woodbury record given by Britton on authority of Mrs. W. McGeorge is in all probability based upon a misidentification. As nearly as Dr. Britton can recollect, the record was one of a number sent to the Geological Survey without accompanying specimens and which were included at the request of the Survey authorities.

XEROPHYLLUM Michaux.

Xerophyllum asphodeloides (L.). Turkey-beard.

Pl. XXXV.

Helonias asphodeloides Linnæus, Sp. Pl. Ed. II. 485. 1762 ["Pennsylvania"]

—Muhlenberg Cat. p. 37, 1813—Pursh, Fl. Am. Sept. I: 243. 1814.

Xerophyllum setifolium Torrey Cat. N. Y. Plants 37. 1819—Torrey Fl. U. S. I: 371, 1824.*Xerophyllum asphodeloides* Nuttall, Gen. I: 235. 1818—Knieskern 32.—Willis 64.—Britton 243.—Keller and Brown 97.

Common in low sandy ground in the Pine Barrens, also very rare and local in the Middle district—Craner's Mill, Middlesex County, and east of Sewell, Gloucester County.

Linnæus states that he received the original specimen from "Barthram," and as he was well known to live in Pennsylvania, that State is given as the type locality. Bartram, however, traveled frequently over southern New Jersey and undoubtedly got his specimens there.

There is no evidence of the plant ever having grown in Pennsylvania.

Fl.—Late May to early July.

Middle District.—E. of Sewell (S), Fairview (H).

Pine Barrens.—Allaire, Ocean Beach (C), Manchester (NB), Toms River (NY), Brown's Mills, Archertown, Bamber, Pemberton (NB), Forked River, Munyon Field, Speedwell (S), Bear Swamp, Clementon, Albion, Jackson, Andrews, Sicklerville (S), Williamstown Inc., Atco, Cedar Brook, Landisville, Winslow Inc., Newtonville, Hammonton, Union Hall, Pleasant Mills (NB), Egg Harbor City, Mays Landing (S).

HELONIAS L.

Helonias bullata L. Swamp Pink.

Pl. XXXVI.

Helonias bullata Linnæus, Sp. Pl. 342. 1753 ["Pennsylvania"—Pennsneck, N. J.].—Knieskern 32.—Willis 64.—Hall, Bull. Torr. Club II: 31, 1871 and III: 25. 1872—Northrup Bull. Torr. Club. XV. 175. 1888—Britton 243.—Keller and Brown 98.—Brown, Bartonis III., 1, 1911.

Helonias latifolia Muhlenberg, Cat. 37. 1813—Pursh, Fl. Amer. Sept. I: 242. 1814.

Swamps of the Pine Barrens, Middle and Cape May districts, frequent. Occurs also at Succasuna and Budds Lake, Morris County.

This is one of the most characteristic plants of the southern half of New Jersey and is one of the earliest spring flowers of

the region. Its dense spike of lilac blossoms, with their bright, blue stamens, is quite conspicuous in the still brown bogs. It begins to bloom when the spike is almost sessile in the center of the rosette of narrow spatulate leaves, but the scape lengthens rapidly and is a foot tall at the height of the flowering season.

Fl.—Early April to mid-May.

Middle District.—Freehold (C), New Egypt, Haddonfield (KB), Medford, Westville, Gloucester (KB), Red Bank, Washington Park, Woodbury, Clarksboro, Laurel Springs, Wenonah (KB), Sicklerville (S), Glassboro, Daretown (KB), Berkley (KB).

Pine Barrens.—Manchester (NB), Bamber, 3 miles east New Egypt, Barnegat, Bear Swamp, Lucaston (KB), Atco (N), Berlin (KB), Clementon, Sumner (S), Jackson, Union Hall, Cedar Brook (KB), Newfield (T), Millville, Hammonton (NB), Collier's Mills (C).

Cape May.—Court House (S), Dias Creek, Cold Spring, Cape May Pt. (S).

CHAMÆLIRIUM Willdenow.

Chamælirium luteum (L.). Blazing Star.

Veratrum luteum Linnæus, Sp. Pl. 1044. 1753 [Virginia and Canada].

Chamaelirium luteum Willis 64.—Britton 243.—Keller and Brown 98.

Woods in the Northern Counties occasional; and very rare in the upper Middle district.

Through a curious misconception Dr. Britton states that this plant is frequent in the southern counties, and Keller and Brown, influenced no doubt by this, give it as frequent in New Jersey. As a matter of fact, none of our local botanists have ever collected it on the New Jersey side of the Delaware in South Jersey, and I have seen only two specimens from within the limits of this list.

Fl.—Late May to mid-June.

Middle District.—Burlington, Mickleton (H).

CHROSPERMA Rafinesque.

Chrosperma muscætoxicum (Walt.). Fly-poison.

Melanthium muscætoxicum Walter, Fl. Car. 125. 1788 [Probably Santee R., S. C.].

Amianthium muscætoxicum Willis, 64.—Gray Man. Ed. I. 501.—Britton 246.

Low sandy ground, locally in the Middle district and occasional in the Pine Barrens.

Fl.—Early June to late June.

Middle District.—New Egypt, Burlington, Pemberton, Moorestown (NB), Beverly (C), Sumner (S), Sicklerville, Williamstown, Camden (C), Mickleton, Tomlin, Swedesboro, Auburn.

Pine Barrens.—Bear Swamp, Vineland (T).

ZIGADENUS Michaux.*

Zigadenus leimanthoides Gray. Coastal Zygadine.

Amianthium leimanthoides Gray, Ann. Lyc. N. Y. IV. 125. 1837 [near Haddonfield, N. J.].

Zigadenus leimanthoides Knieskern 32.—Willis 64.—Gray, Man. Ed. I. 501. 1848.—Britton 246.—Keller and Brown 99.

Swamps of the Middle and Pine Barren districts local. The first specimen mentioned by Dr. Gray in describing this plant was sent to him by Elias Durand, who collected it near Haddonfield, N. J., no doubt at the famous Griffith's Swamp, where specimens were later collected by Charles E. Smith.

Fl.—Late June to mid-July.

Middle District.—Farmingdale, New Egypt, Moorestown (H), Griffith's, Tomlin, Lindenwold, Mt. Pleasant (C).

Pine Barrens.—Toms River (P), Atsion.

MELANTHIUM L.

Melanthium virginicum L.† Bunch-flower.

Melanthium virginicum Linnæus, Sp. Pl. 339. 1753 [Virginia].—Knieskern 32.—Willis 64.—Britton 245.—Keller and Brown 99.

Swamps of the Northern and Middle districts frequent.

Fl.—Early July to late July.

Middle District.—Keyport (C), New Egypt, Burlington, Pemberton (NB), Camden (C), Lindenwold, Kirkwood (KB), Mickleton (H), Swedesboro (KB).

Pine Barrens.—Cedar Brook.

Melanthium latifolium Desr. Crisped Bunch-flower.

Melanthium latifolium Desrousseau in Lam. Encycl. IV. 25. 1797 [Virginia].—Keller and Brown 99.

Frequent in woods of the northern counties, known within our limits only from Swedesboro, where it was discovered by Mr. C. D. Lippincott, July 1, 1894.

Middle District.—Swedesboro (CDL).

* Dr. Small, without any explanation, has proposed *Oceanorus* as the generic name for this plant in his Southern Flora.

† The Tomlin record, given by Keller and Brown, proves to be *Zigadenus*.

VERATRUM L.

Veratrum viride Ait. False Hellebore.

Veratrum viride Aiton, Hort. Kew. III. 422. 1789 [North America].—Knieskern 32.—Britton 245.

Common in shaded swamps in the Northern and upper Middle districts and rare in the Cape May district.

Fl.—Mid-May to early June.

Middle District.—New Egypt, Little Timber Creek (C), Haddonfield (C), Moorestown (C), Tomlin, Mickleton (H), Swedesboro, Marlboro (C), Stoe Creek (C).

Cape May.—Cold Spring (OHB).

UVULARIA L.

Uvularia perfoliata L. Perfoliate Bellwort.

Uvularia perfoliata Linnæus, Sp. Pl. 304. 1753 [Virginia and Canada].—Barton, Fl. Phila. I. 167. 1818.—Willis 64.—Britton 244.

Uvularia flava Pursh, Fl. Am. Sept. I. 231. 1814.—Gray Man. Ed. V. 528. 1867.

Common in the woods of the Northern and less common in the Middle and Cape May districts.

Fl.—Early May to mid-May.

Middle District.—New Egypt, Burlington, Westville, Oaklyn, Medford (S), Mickleton, Swedesboro, Quinton.

Cape May.—Cold Spring (OHB).

Uvularia sessilifolia L. Sessile-leaved Bellwort.

Uvularia sessilifolia Linnæus, Sp. Pl. 305. 1753 [Canada].—Knieskern 32.—Willis 64.—Britton 244.

Common in woods of the Northern and Middle districts; very rare in the Pine Barrens and casual on the coast.

Fl.—Late April to mid-May.

Middle District.—Shark River, Allaire (S), Farmingdale, Sea Bright (NB), New Egypt, Bordentown, Fish House, Delaire, Merchantville (P), Pensauken (S), Medford (S), Lindenwold (S), Westville, Pitman, Glassboro, Woodbury (P), Mickleton, Swedesboro, Albion, Andrews, Yorktown (S), Alloway, Quinton, Bridgeton (NB).

Pine Barrens.—Landisville, Belleplain (S).

Coast Strip.—Manahawkin, Cox's, Cold Spring (OHB).

Uvularia nitida (Britton.) Pine Barren Bellwort.

Oakesia sessilifolia var. (?) *nitida* Britton, Trans. N. Y. Acad. Sci. IX. 13. 1889 [Toms River and Cedar Bridge, N. J.].—Britton 244.

Uvularia nitida Mackenzie, Torrey 1908, 13.—Long, Barton 1910, 20.

Edges of swamps in the Pine Barrens; rare and local.

Fl.—Early May to late May (probably).

Pine Barrens.—Pt. Pleasant, Farmingdale, Toms River (NB), Lakewood (NY), Cedar Bridge (C), Manahawkin, Coxes, West Creek, Browns Mills, Two miles south of Chatsworth.

Family LILIACEÆ. Lilies, etc.

Similar in structure to the last, entire perianth conspicuously colored (not green); bulbous; fruit a loculicidal capsule.

Key to the Species.

- a.* Plants without onion-like odor.
 - b.* Flowers blue, nearly globular, in an erect raceme. [*Muscari botryoides*]*
 - bb.* Flowers red or yellow.
 - c.* Leaves basal or nearly so.
 - d.* Leaves two, mottled with brown, flower single yellow. *Erythronium*, p. 346
 - dd.* Leaves numerous, linear, flowers several at the end of the leafless scape, tawny and orange. [*Hemerocallis fulva*]†
 - cc.* Leaves cauline, verticillate.
 - d.* Flowers 1-3 erect, red. *Lilium philadelphicum*, p. 345
 - dd.* Flowers 1-40, yellow or red, nodding.
 - c.* Flowers 1-16, generally yellow, petals slightly reflexed at tip. *L. candense*, p. 346
 - cc.* Flowers 3-40, orange or reddish orange, petals strongly reflexed from below the middle. *L. superbum*, p. 346
 - bbb.* Flowers white.
 - c.* Small and cylindric in a slender spike-like raceme. *Aletris*, p. 347
 - cc.* Large, opening in sunshine, corymbose, leaves narrow, fleshy. [*Ornithogalum umbellatum*]‡
- aa.* Plants with strong onion-like odor, flowers white or purplish in globose heads.
 - b.* Leaves oblong lanceolate, absent at flowering time. *A. tricoccum*, p. 344
 - bb.* Leaves linear, present at flowering time.
 - c.* Covering of the bulb fibrous reticulated. *A. canadense*, p. 345
 - cc.* Covering of the bulb membranaceous. [*A. vineale*]§

ALLIUM L.

Allium tricoccum Ait. Wild Leek.

Allium tricoccum Aiton, Hort. Kew. I: 428. 1789 [North America].—Britton 241.—Keller and Brown 100.

* Grape Hyacinth, occasionally escaped from gardens.

† Day Lily, often escapes from cultivation.

‡ Star-of-Bethlehem, introduced in damp meadows.

§ Garlic, a frequent and well-known weed.

Rich woods of the northern counties occasional, and rare in the Middle district.

The two basal leaves appear in mid-April and last until early June, perishing before the flowers appear.

Fl.—Late June to early July. *Fruits.*—Abundantly.

Middle District.—Swedesboro, Woodstown (H), Salem (C).

Allium canadense L. Meadow Garlic.

Allium canadense Linnæus, Sp. Pl. 1195. 1753 [Canada].—Britton 241.—Keller and Brown 101.

Frequent in low ground of the northern counties and occasional southward in the Middle and Cape May districts.

This native garlic is much less abundant than the introduced *A. vineale*, and never produces so many flowers. Both have the flowers often replaced to a great extent by bulblets, and in the present species this is the usual condition; some few flowers, however, are usually present, but they rarely produce fruit. I have never seen a head composed entirely of flowers, as is often the case in *A. vineale*.

Fl.—Late May to mid-June.

Middle District.—Farmingdale, Delair, Camden (P), Westville (KB), Medford (S), Mickleton (H), Swedesboro.

Cape May.—Cold Spring (edge of salt marsh) (S).

LILIUM L.

Lilium philadelphicum L. Red Lily.

Lilium philadelphicum Linnæus, Sp. Pl. Ed. II:435. 1762 [Linnæus gives Canada as type locality, but this is obviously a lapsus calami, as his only reference is to Miller whose specimen came from John Bartram, Philadelphia].—Knieskern 32.—Willis 65.—Britton 242.—Keller and Brown 101.

Frequent in open ground in the northern counties, but very rare in the Middle district. Two of the four records refer to single plants. Knieskern's statement for Monmouth and Ocean Counties, "open copses not rare" is surely a misprint.

Fl.—Late June to late July.

Middle District.—Keyport (C), Mickleton (H), Swedesboro.

Pine Barrens?—Mays Landing (C) once.

Lilium canadense L. Yellow Lily.

Pl. XXXIX., Fig. 1.

Lilium canadense Linnæus, Sp. Pl. 303. 1753 [Canada].—Knieskern 32.—Willis 65.—Britton 242.

Frequent in swamps and meadows of the northern counties; very scarce in the Middle district. One of the localities given by Britton in Pemberton Junction, but lilies collected there in July, 1910, proved to be a yellow form of *L. superbum*. These may or may not have been the plants referred to.

Fl.—Mid-June to mid-July.

Middle District.—Farmingdale, Birmingham (NB), Pemberton Jnc. (C), Washington Park.

Lilium superbum L. Turk's-Cap Lily.

Lilium superbum Linnæus, Sp. Pl. Ed. II:434. 1762 [North America].—Barton Fl. Phila I:166. 1818—Knieskern 32.—Willis 65.

Common in swamps and low grounds from the Hackensack meadows throughout the Middle, Pine Barren and Cape May districts.

This is the lily of southern New Jersey and one of the showiest summer wild flowers. In the Pine Barren swamps it is often only two or three feet high with a single flower, while in the richer ground of West Jersey it attains twice this size and bears a great pyramid of blossoms, sometimes twenty to thirty on a single stalk.

Fl.—Early July to late July.

Middle District.—Lindenwold (S), Tomlin (S), Pemberton Jnc. (S), Pemberton (NB), Dividing Creek.

Pine Barrens.—Toms River (S), Wareham, Folsom, Ballenger's Mill (S), Penbryn (S), Winslow (S), Landisville, Crowletown, Mays Landing (S), Manumuskin (S).

Cape May.—Cold Spring (OHB).

ERYTHRONIUM L.

Erythronium americanum Ker. 'Dog-toothed Violet.' Yellow Adder's Tongue.

Pl. XL., XLI., Fig. 1.

Erythronium Americanum Ker. Bot. Mag. pl. 113, I. Je. 1898 [North America].—Knieskern 32.—Willis 65.—Britton 242.

Common in low woods and along streams in the Northern district, but much rarer and local within our limits, where it occurs only in the Middle district, being entirely absent from the Pine Barrens and coast.

Fl.—Early April to late April.

Middle District.—New Egypt, Bordentown, Kinkora, Little Timber Creek (C), Merchantville (P), Gloucester (P), Haddonfield (C), Medford (S), Mickleton (H), Swedesboro, Alloway.

ALETRIS L.

Aletris farinosa L. Colic Root.

Aletris farinosa Linnaeus, Sp. Pl. 319. 1753 [Pennsylvania].—Knieskern 31.—Willis 63.—Britton 237.

Aletris aurea Britton 237.—Rusby, Bull. Torr. Bot. Club VI. 289. 1879.—? Pursh Fl. Amer. Sept. I. 225. 1814.—Willis 63.

Casually in the northern counties in sandy ground and common throughout our limits.

There is a form of this plant with shorter leaves and shorter, more nearly spherical, flowers found especially near the "plains," but the differences do not seem sufficiently well marked or constant to warrant separation. While certainly not *A. aurea*, this plant seems to have been the basis for the inclusion of that species in Britton's Catalogue; the Rusby plant referred to was in fruit and its identity was not clearly determined. Pursh, who reported *A. aurea* from New Jersey, may have had the same form in mind.

Fl.—Mid-June to late July.

Middle District.—Mattewan (NY), Pt. Pleasant, Farmingdale, Paulsboro, Lindenwold (S), Lawnside (S), Sicklerville (S), Swedesboro, Elmer (P).

Pine Barrens.—Allaire (S), Speedwell (S), E. Plains (S), near Atsion (C), Jackson (P), Williamstown Inc., Winslow Inc., Pancoast (S).

Coast Strip.—Spray Beach (L), Manahawkin, Stone Harbor.

Cape May.—Cold Spring, Bennett (S).

Family CONVALLARIACEÆ. Solomon's Seal, etc.

Differ from the Lilies in having simple or branched root stalks—not bulbs; and in having fleshy berry-like fruit. *Trillium* has the perianth clearly divided into sepals (green) and petals (white or pink).

Key to the Species.

- a. Leaves reduced to scales, whole plant a feathery mass of filiform branches. [*Asparagus officinalis*]*
- aa. Leaves oblong, lanceolate or oval, alternate.
 - b. Flowers white in a terminal panicle or raceme.
 - c. Leaves 1-3. *Unifolium*, p. 349
 - cc. Leaves more than 3.
 - d. Flowers in a panicle, numerous. *Vagnera racemosa*, p. 348
 - dd. Flowers larger and fewer in a raceme. *V. stellata*, p. 348
 - bb. Flowers axillary, single or 2-10 in an umbel, drooping. *Polygonatum*, p. 349
- aaa. Leaves whorled, lanceolate, obovate or rhombic.
 - b. One whorl of three leaves, with a central flower.
 - c. Flower erect, white or purple. *Trillium erectum*, p. 350
 - cc. Flower recurved under the leaves. *T. cernuum*, p. 350
 - bb. Leaves in two whorls of 3-10. Flowers several, recurved under the upper whorl, greenish yellow. *Medeola*, p. 350

VAGNERA Adanson.***Vagnera racemosa* (L.). Wild Spikenard.**

Convallaria racemosa Linnæus, Sp. Pl. 315. 1753 [Virginia and Canada].

Smilacina racemosa Knieskern 31.—Willis 64.

Unifolium racemosum—Britton 240.

Common in woods of the Northern and Middle districts, occasional in the Cape May and Coast regions, but absent from the Pine Barrens.

Fl.—Mid-May to early June.

Middle District.—Freehold (NB), Farmingdale, New Egypt, Bordentown, Pemberton Inc. (S), Kinkora (NY), Delaire, Fish House, Medford (S), Washington Park, Lawnside (S), Lindenwold (S), Mickleton, Mantua, Sewell (S), Glassboro, Swedesboro, Yorktown, Riddleton, Salem (S).

Coast Strip.—Atlantic City (S).

Cape May.—Cold Spring (OHB).

***Vagnera stellata* (L.). Star-flowered Spikenard.**

Convallaria stellata Linnæus, Sp. Pl. 316. 1753 [Canada].

Smilacina stellata Willis 64.—Britton Bull. Torrey Bot. Club XV. 97. 1888.

Unifolium stellatum Britton 241.

Vagnera stellata Keller and Brown 103.

Northern counties and southward along the coast strip to Cape May, but not found elsewhere in the State.

* *Asparagus*, escaped from cultivation in some places.

This curious distribution, which is shared by *Geranium robertianum* and some other species, is discussed at p. 105.

Fl.—Early May to late May.

Middle District.—Freehold (C).

Coast Strip.—Sandy Hook, Sea Bright (NB), Barnegat City (L), Cedar Bonnet (L), Beach Haven Terrace (L), Ocean City (S), Wildwood, Peermont, Cold Spring, Cape May Pt. (KB), Sea Breeze, Salem Co. (P).

POLYGONATUM Hill.

Polygonatum commutatum (R. & S.). Smooth Solomon's Seal.

Convallaria commutata Roemer and Schultes Syst. 7. 1671. 1830 [Pennsylvania].

Polygonatum giganteum Knieskern 32.—Willis 65.

Polygonatum commutatum Britton 240.

Polygonatum biflorum Knieskern 32.—Willis 65 (in part).—Britton 240 (in part).

In woods of the Northern, Middle and Coast districts rather common; rare and perhaps recently introduced in the Pine Barrens.

In spite of the general statements in the catalogues of Britton and Keller and Brown, I can find no authentic specimens of *P. biflorum* from our region. The present plant is extremely variable in size, width of leaves and number of flowers, and would lead one to suppose that more than one species were represented, but it is impossible to find any constant differences between them and none are referable to *S. biflora* of the northern counties.

Fl.—Mid-May to early June.

Middle District.—Farmingdale, New Egypt, Bordentown (C), Delaire, Camden (P), Washington, Medford (S), Mickleton, Lindenwold (S), Albion, Pitman, Iona (S), Swedesboro, Shiloh (C), Yorktown (S), Riddleton, Daretown (C), Quinton, Centerton (S), Bridgeton (C).

Pine Barrens.—Atco (C), Cedar Lake, Landisville, Folsom.

Coast Strip.—Surf City (L), Atlantic City (S), Ocean City (S), Piermont (S), Anglesea, Wildwood (UP).

Cape May.—Cold Spring (OHB), Cape May Pt. (S).

UNIFOLIUM Adanson.

Unifolium canadense (Desf.). False Lily-of-the-Valley.

Pl. XXXVIII., Fig. 1.

Maianthemum Canadense Desfontaine, Ann. Mus. Paris IX. 54. 1807 [new name for *Convallaria biflora* Michx. from Canada].

Smilacina biflora Knieskern 32.—Willis 64.

Unifolium Canadense Britton 241.

Smilacina canadensis Barton, Fl. Phila. 1. 167. 1818.

Common in woods throughout the State except in the Pine Barrens.

Fl.—Early May to early June.

Middle District.—Farmingdale, Pt. Pleasant, New Egypt, Pemberton (NY), Bordentown, Delanco, Springdale (S), Medford (S), Lindenwold (S), Tomlin, Pitman, Swedesboro, Yorktown, Centerton (S).

Coast Strip.—Surf City (L), Cox's, Atlantic City (S), Anglesea.

Cape May.—Goshen (S), Cold Spring (OHB).

MEDEOLA L.

Medeola virginiana L. Indian Cucumber.

Medeola virginiana Linnæus, Sp. Pl. 339. 1753 [Virginia].—Knieskern 32.—Britton 244.

Rich woods of the Northern, Middle and Cape May districts; very rare in the Pine Barrens.

Fl.—Late May to mid-June.

Middle District.—Farmingdale, New Egypt, Bordentown, Kinkora, Burlington, Birmingham, Delair, Camden (P), Vincenttown (NB), Medford (S), Washington Park, Lawnside (S), Tomlin, Sewell (S), Mickleton, Sicklerville (S), Pitman, Glassboro, Swedesboro, Yorktown, Dividing Creek.

Pine Barrens.—Landisville (T), Hammonton (Bassett), Belleplain (S).

Coast Strip.—Manahawkin.

Cape May.—Goshen (S), Cold Spring (OHB).

TRILLIUM L.

Trillium erectum L. Ill-scented Wake-robin.

Trillium erectum Linnæus, Sp. Pl. 340. 1753 [Virginia].—Britton 437.

Rich woods; at a number of stations in the northern counties and at one in the Middle district within our limits.

Fl.—Early May to mid-May.

Middle District.—Bordentown (C).

Trillium cernuum (L.). Nodding Wake-robin.

Trillium cernuum Linnæus, Sp. Pl. 339. 1753 [Carolina].—Willis 64.—Britton 245.—Keller and Brown 103.

Rich woods; frequent in the northern counties, rare and local southward in the Middle district.

Fl.—Early May to mid-May.

Middle District.—New Egypt, Woodbury (C), Mickleton, Mullica Hill (NB), Swedesboro, Swedesbridge (KB), Woodstown (KB).

Family SMILACEÆ. Smilax.

Woody or herbaceous vines, with berry-like fruit; flowers similar to those of the last family, but dioecious, in axillary umbels; green.

SMILAX L.

Key to the Species.

- a. Stem herbaceous, not armed with prickles.
 - b. Flowers carrion-scented, leaves ovate thin.
 - c. Leaves glabrous. *S. herbacea*, p. 351
 - cc. Leaves pubescent below. *S. pulverulenta*, p. 351
 - bb. Flowers not carrion-scented, leaves hastate, somewhat coraceous.
 - S. tannifolia*, p. 352
- aa. Stem woody, usually with strong prickles.
 - b. Leaves ovate, stem prickly at base or not at all, berries red.
 - S. walteri*, p. 354
 - bb. Leaves ovate or rounded, branches and stems with strong prickles, berries black with a bloom.
 - S. rotundifolia*, p. 352
 - bbb. Leaves lanceolate, thick and evergreen, stem but not branches armed with prickles, berries black.
 - S. laurifolia*, p. 353
 - bbbb. Leaves variously shaped, ovate to oblong lanceolate, always glaucous, stem usually prickly, berries bluish black.
 - S. glauca*, p. 353

Smilax herbacea L. Carrion-flower.

Smilax herbacea Linnæus, Sp. Pl. 1030. 1753 [Virginia and Maryland].—Willis 63.—Britton 239.

Frequent in the Northern and Middle districts in low ground.

Fl.—Late May to early June. *Fr.*—Late summer of the first season.

Middle District.—Allaire (S), Farmingdale, New Egypt, Bordentown, Kaighns Pt., Lindenwold (S), Washington Park, Westville (NB), Woodbury, Mickleton (H).

Smilax pulverulenta (Michx.). Hairy Carrion Flower.

Smilax pulverulenta Michaux, Fl. Bor. Am. II. 238. 1803 [Canada and Penna.].

Similar situations to the last, but much less common.

Fl.—Mid-May to late May. *Fr.*—Late summer of the first season.

Middle District.—Swedesboro, Mickleton (H).

***Smilax tamnifolia* Michx. Halberd-leaved *Smilax*.**

Smilax tamnifolia Michaux, Fl. Bor. Am. II. 238. 1803 [Carolina].—Knieskern 32.—Willis 63.—Gray Man. Ed. I. 486. 1848.—Britton 240.

?*Smilax panduratus* Pursh Fl. Amer. Sept. I. 251. 1814 [as relates to N. J.].

?*Smilax tamnoides* Willis 63.

?*Smilax pseudochina* Pursh Fl. Amer. Sept. I. 250. 1814 [as relates to N. J.].—Willis 63.

Frequent or common in moist sandy ground, usually in shade, throughout our region, but no farther north. Most plentiful in the Pine Barrens.

The variations in leaf-form exhibited by this species may have had something to do with the inclusion of *Smilax bona-nox* (= *panduratus*) and *S. pseudochina* among the plants of New Jersey in the various editions of Gray's Manual, Willis' list, etc. Both are given by Pursh as occurring in the State, and subsequent records are merely copied from him. Whatever may have been the source of his statement, it was apparently quite erroneous, as there is no evidence that either species is found in New Jersey.

Fl.—Mid-June to early July. *Fr.*—Early autumn of the first season.

Middle District.—Lake Como (NB), Spring Lake (C), Freehold (C), Farmingdale, Pt. Pleasant (S), Repaupo, Camden (P), Tomlin (S), Yorktown, Beaver Dam.

Pine Barrens.—Hanover, Speedwell (S), Barnegat, Waretown, Coxe's, Clementon (S), Sumner, Sicklerville, Waterford, Cedar Brook, Iona (S), Vineland (S), Hammonton (S), Pleasantville, Egg Harbor City (S), Absecon (S), Maurice River.

Cape May.—Goshen (S), Court House, Bennett, Cold Spring (OHB), Whitesboro (3), Cape May.

***Smilax rotundifolia* L. Greenbrier.**

Smilax rotundifolia Linnæus, Sp. Pl. 1030. 1753 [Canada].—Knieskern 31.—Willis 63.—Britton 239.

Common in swampy thickets throughout the State.

This is the commonest and stoutest of the Greenbriers. While apparently not common in the Pine Barrens proper, it makes the thickets along the edge of the coast strip almost impenetrable with its strong woody stems and stout thorns.

Fl.—Early May to early June. *Fr.*—Mid-autumn of the first season persisting well into winter.

Middle District.—Farmingdale, Delaire, Kinkora, Birmingham, W. Deptford, Woodbury, Pitman, Glassboro, Salem (S).

Pine Barrens.—Toms River (NB), Quaker Bridge (S), Speedwell (S), Tuckahoe (S), Manumuskine.

Coast Strip.—Sandy Hook (NB), Seaside Park (Ha) Surf City (L), Beach Haven Crest (L), Barnegat City (L), Beach Haven Terrace (L), Holgate's (L), Manahawkin, Atlantic City (S), Ocean City (S), Cold Spring (S).

***Smilax glauca* Walt. Glauous-leaved Greenbrier.**

Smilax glauca Walter, Fl. Car. 245. 1788 [South Carolina, probably Santee River].—Willis 63.—Britton 239.—Keller and Brown 104.

Occasional in the northern counties and plentiful throughout our region in dry, sandy soil.

Fl.—Late May to late June. *Fr.*—Mid-autumn of the first season persisting well into winter.

Middle District.—Keyport (NY), Farmingdale (NY), Griffith's Swamp, Washington Park.

Pine Barrens.—Lakewood (NY), Manahawkin, Quaker Bridge (NB), Speedwell (S), Plains (S), Tabernacle (S), Albion, Williamstown Inc. (S), Sicklerville (S), Winslow (S), Batsto (NY).

Coast Strip.—Barnegat City (L), Spray Beach (L), Holgate's (L), Atlantic City (S), Ocean City (S), Anglesea.

Cape May.—Cold Spring (OHB), Town Bank.

***Smilax laurifolia* L. Laurel-leaved Greenbrier.**

Smilax laurifolia Linnæus, Sp. Pl. 1030. 1753 [Virginia and Carolina].—Pursh Fl. Am. Sept. I. 250. 1814.—Willis 63.—Britton 239.—Keller and Brown 105.

Wooded swamps of the Pine Barren and Cape May regions rather local.

This is a distinctively Pine Barren species, and its long, thick, glossy leaves hanging in festoons from the trees and bushes on the edge of the deep swamps at once attract attention as being strikingly different from anything we are familiar with in other parts of the State. In winter it is still more conspicuous, owing to the evergreen character of the leaves.

Fl.—Early August to early September. *Fr.*—Early autumn of the second season, persisting into winter.

Pine Barrens.—Toms River (C), Forked River, Bamber, Barnegat, Speedwell, Quaker Bridge, Hammonton, Batsto Creek (NB), Herman, Elwood (KB), Egg Harbor City, Eighth St.

Cape May.—Dias Creek, New England.

***Smilax walteri* Pursh. Walter's Greenbrier.**

Smilax Walteri Pursh, Fl. Am. Sept. 249. 1814 [Low, sandy counties of Virginia and Carolina].—Willis 63.—Britton 239.—Keller and Brown 105.—Grays Man. Ed. V., p. 519. 1867.

Deep swampy thickets of the Pine Barren and Cape May districts, local.

This is another southern smilax, but since its leaves bear a general resemblance to those of *S. rotundifolia*, it is easily overlooked in summertime unless one is especially searching for it. In autumn and winter, however, the coral red berries make it particularly conspicuous and distinguish it at once from all other species.

Its discovery in New Jersey is somewhat involved in doubt. It is first recorded from the State in Gray's Manual, fifth edition.

Fl.—Early May to early June. *Fr.*—Mid-autumn of the first season, persisting well into winter.

Pine Barrens.—Atsion (P), Quaker Bridge, Vineland (KB), Landisville, Twelfth St. Folsom, Weymouth to Elwood, N. of Weekstown, Egg Harbor City (NB), Petersburg, Mays Landing (CP).

Cape May.—Cold Spring (OHB).

FAMILY HAEMODORACEÆ. Red-root.

Differs from all the preceding families and agrees with the following in having the ovary inferior. Stamens 3, opposite the inner segments of the perianth.

GYROTHECA.

***Gyrotheca tinctoria* (Walt.). Red-root.**

Anonymos tinctoria Walter, Fl. Car. 67. 1788 [South Carolina, probably Santee River].

Lachnanthes tinctoria Knieskern 31.—Willis, 63.

Gyrotheca tinctoria Britton 236.—Keller and Brown 105.

Dilatris Heritiera Barton, Fl. Phila I. 22. 1818.

Swamps and bogs of the Pine Barren and Cape May districts, common.

Unlike many other bog plants, this species is not injured by the cultivation and flooding of the cranberry bogs; on the contrary, it increases under these conditions until it becomes a positive weed, and great heaps of the plants are often to be seen stacked up on the dykes after the weeding of the bog. It bears a resemblance to *Lophiola*, but is not so delicate in color, the wooly covering being always duller and more rusty.

Fl.—Early July to late August.

Pine Barrens.—Near New Egypt, Toms River, Forked River, Island Hts. (NY), Manchester (NY), Bamber, Pasadena, West Creek, Tuckerton, Browns Mills, Hanover, Clementon, Jackson (P), Bear Swamp, Ballengers Mills, Braddock's Mills, Williamstown Inc., Cedar Brook, Parkdale, Atsion, Quaker Bridge, Batsto, Pleasant Mills, Herman, Hammonton, Hospitality Br. Eighth St., Twelfth St., Mays Landing.

Cape May.—Court House (S), Bennett (OHB).

FAMILY AMARYLLIDACEÆ. Stargrass, etc.

Differs from the preceding in having 6 stamens.

Key to the Species.

- | | |
|--|--------------------------|
| <i>a.</i> Stem leafy, flowers densely wooly. | <i>Lophiola</i> , p. 355 |
| <i>aa.</i> Leaves basal grass-like, flowers not wooly. | <i>Hypoxis</i> , p. 355 |

HYPOXIS L.

Hypoxis hirsuta (L.). Stargrass.

Ornithogalum hirsutum Linnæus, Sp. Pl. 306. 1753 [Virginia and Canada].

Hypoxis graminea Pursh, Fl. Am. Sept. I. 224. 1814.

Hypoxis erecta Barton, Fl. Phila. I. 162. 1818.—Knieskern 31.—Willis 63.

Hypoxys Britton 238.

Frequent in sandy ground throughout the State except the coast and Cape May districts (?)

Fl.—Mid-May, and rarely and irregularly through the summer even to September.

Middle District.—Shark River, New Egypt, Delanco, Sewell (S), Lindenwold (S).

Pine Barrens.—Allaire (S), Plains (S), Manahawkin, Landisville (T), Hammonton (S).

LOPHIOLA Kerr.

Lophiola aurea Kerr. Golden-crest.

Pl. XXXIV., Fig. 2.

Lophiola aurea Kerr, Curtis Bot. Mag. pl. 1596. Nov. 1, 1813 [N. America].

Conostylis Americana Pursh, Fl. Am. Sept. I. 224. 1814 [Pine Barrens of New Jersey and Carolina].—Torrey, Fl. U. S. I. 344. 1824.

Helonias tomentosa Muhlenberg Cat. 37.

Lophiola aurea Knieskern 31.—Willis 63.

Lophiola tomentosa Britton 237.

Lophiola americana Keller and Brown 105.

Frequent in Pine Barren swamps and bogs.

This is a striking plant found only in the heart of the Pine Barrens. The dense, wooly covering of the flowers recalls the *Eidelweiss* of the Swiss mountains, and from the downy, white clusters the little yellow flowers peep out like tiny stars. The plant has a close general resemblance to *Gyrotheca*, but its wooly coat is denser and much purer white. This was one of the plants first discovered by Frederick Pursh in his tramps across the wilds of New Jersey and was published by Kerr in Curtis' Botanical Magazine, from Pursh's original specimens shortly before the appearance of his Flora.

The untouched bogs of the Wading River are the headquarters for *Lophiola*. One well-known spot I always associate with it. A low, scattered growth of Pitch Pines slopes down on either side to the moist savanna, through which flows the rapid, tea-colored stream. On the edge of the moist ground is a dense, low, shrubby growth of White Azalea, three or four species of Huckleberries and the Inkberry—*Ilex glabra*. White Cedars mark the course of the stream, now forming dense clusters, now scattering, with young ones standing out here and there in the grassy, open stretches, and with the Cedars along the bank are Red Maples, Wax Myrtles and beds of Royal Fern, *Carex livida* and *Eleocharis tuberculosa*.

The "Savannas" are covered with the tall stalks of *Danthonia epilis*, while the denser growth below contains *Panicum ensifolium*, *Rhynchospora* of several species, *Scleria minor*, etc., all rising from a bed of sphagnum, or from patches of wet, white sand and scattered all about in definite clumps are the Pitcher plants, with pitchers of all shades and combinations of green and crimson, and the button-topped stalks of the Pipeworts *Eriocaulon compressum* and *decanulare*—the former at this date, July 4, scattering its chaff at the slightest touch, the latter only in

* Record for Browns Mills (KB) proves to be *Gyrotheca*.

bud. With them, but not so definitely tufted, are the yellow spikes of the *Abama*, the white, gummy-stemmed *Tofieldia* and beds of the snowy, wooly heads of the *Lophiola*. There are crimson *Limnodorums* and pink *Pogonias* starring the grass here and there, and where shallow, rusty, iron-stained pools are formed on either side of the rapid-flowing stream; there are solid masses of yellow *Utricularias*, shining like beds of gold in the sunlight. And in the deep water are white pond lilies and velvety leaves of the Golden Club, now gone to seed, erect emerged spikes of *Juncus militaris* and *Nyris congdoni* and great beds of *Eriocaulon septangulare* and *Scirpus subterminalis*, their leaves and stems ever swaying in the steady current. Truly one of nature's flower gardens, and it stretches for miles, following the course of the streams through the wilderness of pine, cedar and white sand, now narrowing, now widening out into broad stretches. Some seasons it is saturated with water and one can only browse along the edges, at others the dried vegetation forms a crust upon which one can walk with ease, though ever mindful that beneath is an almost bottomless morass of mud and decayed vegetation, so that it is safer in such spots to trust to fallen cedar logs and dense clumps of rushes in shaping one's course.

Fl.—Late June to late July.

Pine Barrens—Manchester (NB), Toms River, Whitings, Hanover, Clementon (H), Double Trouble, Island Hts. (KB), Woodmansie (KB), Forked River, Waretown (KB), West Creek (S), Stafford Forge (S), Tuckerton, Jones Mill (S), High Bridge (S), Speedwell, Chatsworth, Berlin (KB), Atco (KB), Jackson (P), Hammonton (Bassett), Atsion, Parkdale, Quaker Bridge, Elwood (KB), Pleasant Mills (S), Eighth St.

Family DIOSCOREACEÆ. Yams.

Trailing vines with flowers similar to those of the last family, but dioecious.

DIOSCOREA L.*

Key to the Species.

- a. Leaves somewhat pubescent beneath.
- aa. Leaves glabrous.

D. villosa, p. 358

D. v. glabrifolia, p. 358

* Cf. Bartlett Bull. 189, Bur. Plant Indust. U. S. Dep. Agr.

Dioscorea villosa L. Wild Yam.

Dioscorea villosa Linnæus, Sp. Pl. 1033. 1753 [Virginia and Florida].—Knieskern 31.—Willis 63.—Britton 238.

Thickets, usually in damp ground, throughout the State, except in the Pine Barren and coast districts, frequent.

Only one of Linnæus' references is based upon an identifiable plant, and as that is our species, I prefer to retain his name.

Fl.—Mid-June to mid-July. *Fr.*—Early autumn.

Middle District.—New Egypt, Birmingham, Hartford, Medford (S), Chairville (S), Washington Park, Dividing Creek.

Pine Barrens.—Landisville (T), Twelfth St., Albion, Weekstown.

Coast Strip.—Manahawkin, Barnegat, Coxe's, Five-Mile Beach (T).

Cape May.—Goshen (S), Dias Creek (S), Cold Spring (S).

Dioscorea villosa glabrifolia (Bartlett). Smooth Wild Yam.

Dioscorea paniculata glabrifolia Bartlett, Bull. 189, U. S. Dept. Agr., Bureau Pl. Indust., 1910. 15 [Cherokee Co., Kas.].

Less common than the preceding and collected only in the Middle district.

Fl. and *Fr.*—Similar to that of the preceding.

Middle District.—Farmingdale, Pt. Pleasant, Hartford, Yorktown.

Family IRIDACEÆ. Flags, etc.

Stamens, three opposite the outer segments of the perianth, style sometimes with large petal-like divisions. Comprises our Flags and Blue-eyed Grasses.

Key to the Species.

a. Flowers blue.

b. Style branches broad and petal-like, flowers large.

c. Leaves 12–25 mm. wide.

I. versicolor, p. 359

cc. Leaves 3–5 mm. wide.

I. prismatica, p. 359

bb. Style branches filiform or obsolete, flowers small.

c. Stem usually simple with a sessile terminal spathe.

d. Capsules dark, 4–6 mm. high, pedicels about as long as the inner bract, stems 1.5–3 mm. broad, spathes usually green.

Sisyrinchium angustifolium, p. 360

dd. Capsules pale, 2–4 mm. high, pedicel longer than the inner bract, stems 5–1.5 mm. broad, spathes usually purplish.

S. mucronatum, p. 350

cc. Stem branched above, bearing two or more spathes.

- d.* Inner bract scarious obtuse, 10-15 mm. long, stems wiry, often geniculate, plant pale and glaucous. *S. atlanticum*, p. 360
- dd.* Inner bract acute, not scarious.
- e.* Pedicels about as long as the inner bract. *S. angustifolium*, p. 360
- ee.* Pedicels longer than bract.
- f.* Stems .5-1.5 mm. broad, narrowly winged, not black when dry. *S. mucronatum*, p. 360
- ff.* Stems 1.5-6 mm. broad, black when dried.
- g.* Base of tufts covered with fibers, stem narrowly winged. *S. arenicola*, p. 360
- gg.* Base of tufts without coarse fibers stem, broadly winged. *S. graminoides*, p. 360
- aa.* Flowers crimson and purple mottled. [*Gemmingia chinensis*]*

IRIS L.

Iris versicolor L. Large Blue Flag.

XXXVII., Fig. 1.

Iris versicolor Linnæus, Sp. Pl. 39. 1753 [Virginia, Maryland and Pennsylvania].—Knieskern 31.—Willis 63.—Britton 273.

Swamps or meadows; common throughout the State except in the Pine Barrens.

Fl.—Mid-May to mid-June.

Middle District.—New Egypt, Delanco, Timber Creek, Camden, Medford (S), Haddonfield, Lindenwold (S), Sewell (S), Swedesboro, Dividing Creek.

Pine Barrens.—Landisville (introduced?).

Coast Strip.—Cox's, Ship Bottom (L), Barnegat City Inc. (L), Piermont, Holly Beach (UP), Cold Spring (OHB).

Iris prismatica Pursh. Slender Blue Flag.

Iris prismatica Pursh, Fl. Am. Sept. 30. 1814 [New Jersey near Egg Harbor].

—Barton, Fl. Phila. I. 21. 1818.—Britton 273.—Keller and Brown 100.

Iris virginica Knieskern 31.—Willis 63.

Swamps; occasional in the northern counties, common in the Middle and Pine Barren districts.

Fl.—Late May to late June.

Middle District.—New Egypt, Shark River, Pt. Pleasant, Pemberton Inc. (S), Burlington, Lindenwold.

Pine Barrens.—Forked River, High Bridge (S), White Horse, Bear Swamp, Landisville, Sicklerville (S), Williamstown Inc., Winslow Inc., Hamonton, Egg Harbor City, Tuckahoe (S).

Coast Strip.—Sherburn's (L), Holgate's (L).

Cape May.—Cold Spring (OHB).

* Blackberry Lily, an Iris-like plant, occasionally escaping from cultivation.

SISYRINCHIUM L.

Sisyrinchium mucronatum Mich. **Michaux's Blue-eyed Grass.**

Sisyrinchium mucronatum Michaux, Flor. Bor. Am. II. 23. 1803 [Pennsylvania].

Sisyrinchium intermedium Bicknell, Bull. Torrey Bot. Club 26. Sept., 1899. 498 [Mickleton, N. J.].

Occasional in the Middle district and at Mays Landing, probably more common northward. *S. intermedium* Bicknell, seems to be merely an aberrant form of this, without constant distinguishing characters.

Fl.—Mid-May to mid-June. *Fr.*—Early June to early July.

Middle District.—Burlington, Mickleton.

Pine Barrens.—Mays Landing.

Sisyrinchium angustifolium Mill. **Northern Blue-eyed Grass.**

Sisyrinchium angustifolium Miller, Gard. Dict. Ed. 8. 2. 1768 [no loc.].—Britton 238 (in part).

Rare and local, apparently coastal.

Fl., etc.—Probably similar to *S. mucronatum*.

Coast Strip.—Herman (below Batsto), Tuckerton.

Sisyrinchium graminoides Bicknell. **Broad-leaved Blue-eyed Grass.**

Sisyrinchium graminoides Bicknell, Bull. Torr. Club 23. 133. 1896 [Eastern U. S., Mass. southward].

?*Sisyrinchium mucronatum* Barton Fl. Phila. I. 23. 1818.

Common in meadows and moist ground in the Middle and rare in the coast district.

Fl.—Late May to late June. *Fr.*—Mid-June to mid-July.

Middle District.—New Egypt, Farmingdale (S), Burlington, Wenonah, Washington Park, Andrews, Buckshutem, Swedesboro.

Coast Strip.—Piermont.

Sisyrinchium atlanticum Bicknell. **Coastal Blue-eyed Grass.**

Sisyrinchium Atlanticum Bicknell, Bull. Torr. Club 23. 134. 1896 [Van Courtland Park, N. Y. City].—Keller and Brown 106.

?*Sisyrinchium anceps* Torrey Fl. U. S. I. 42. 1824.

Sisyrinchium Bermudiana Knieskern 31.—Willis 63.

Common in swamps and meadows throughout our region and probably northward as well. Most plentiful in the Pine Barrens.

Fl.—Mid-May to mid-June. *Fr.*—Early June to early July.

Middle District.—Farmingdale (S), Pt. Pleasant, New Egypt, Pemberton (NY), Lindenwold, Washington Park, Glassboro, Yorktown, Buckshutem.

Pine Barrens.—Allaire (S), Bayhead, Forked River, Bamber, Manahawkin, West Creek, Browns Mills, Albion, Landisville, Bear Swamp, Williamstown Jnc., Cedar Lake, Egg Harbor City, Tuckahoe.

Coast Strip.—Surf City (L), Barnegat City (L), Beach Haven (L), Spray Beach (L), Beach Haven Terrace (L), Avalon.

***Sisyrinchium arenicola* Bicknell. Sand Blue-eyed Grass.**

Sisyrinchium arenicola Bicknell, Torrey Club Bull. 26. Sept. 1899. 496
[Coast of Long Island and New Jersey].

Middle district, not very abundant.

Fl.—Late May to late June. *Fr.*—Mid-June to mid-July.

Middle District.—Red Bank (NY), New Egypt, Birmingham, Asbury Park, Clementon, Millville, Yorktown.

Order ORCHIDALES.

Family ORCHIDACEÆ. Orchids.

Perennial herbs with tuberous roots or bulbs. Flowers curiously irregular, composed of six segments, the three outer (sepals) similar to one another, the lateral inner ones (petals) similar, but the middle one developed into a lip, usually larger than the others, fringed or spurred. Stamens often united with the style, pollen in several stalked masses; stigma, a viscid surface opposite the lip.

Includes many of our most interesting and curious plants. Well represented in the bogs of the Pine Barrens.

Key to the Species.

- a. Anthers 2; lip forming a large inflated sack.
 - b. Flower purple, leaves at base. *Cypripedium acaule*, p. 363
 - bb. Flower yellow, leaves scattered on the stem.
 - c. Lip 30–50 mm. long. *C. pubescens*, p. 364
 - cc. Lip 25–30 mm. long. *C. parviflorum*, p. 364
- aa. Anther 1; lip not inflated into a sack.
 - b. Flowers with a distinct slender spur, arranged a spike.
 - c. Leaves present at flowering time.
 - d. Flowers white.
 - e. Lip with long fringe. *Blephariglottis blephariglottis*, p. 367
 - ea. Lip not fringed. *Gymnadeniopsis nivea*, p. 366

dd. Flowers orange.

e. Lip fringed.

f. Five mm. long.

Blephariglottis cristata, p. 367

ff. Ten mm. long.

B. ciliaris, p. 367

cc. Lip not fringed.

Gymnadeniopsis integra, p. 365

ddd. Flowers pink.

e. Lip fringed.

f. 10-12 mm. broad, spike 30 mm. in diameter.

B. psycodes, p. 369

ff. 18-20 mm. broad, spike 50 mm. in diameter.

B. grandiflora, p. 359

cc. Lip not fringed, but somewhat irregular.

B. peramoena, p. —

dddd. Flowers green or greenish white.

e. Lip fringed.

B. lacera, p. 369

ee. Lip not fringed, but somewhat irregular.

f. Lip three parted at tip, flowers greenish white.

Gymnadeniopsis clavellata, p. 365

ff. Lip truncate at tip, flowers pale yellowish green.

Perularia flava, p. 364

dddd. Flowers pink and white, leaves two, at base.

Galearis spectabilis, p. 364

cc. Leaf (single at base) absent at flowering time, flowers green tinged with purple.

Tipularia discolor, p. 378

bb. Flowers without a spur.

c. Flowers at least 15 mm. in diameter, single or several on a stalk.

d. Leaf linear or lanceolate grass-like, flowers pink.

e. Flowers 4-10.

Limodorum tuberosum, p. 372

ee. Flower solitary (leaf absent at flowering time).

Arethusa bulbosa, p. 372

dd. Leaf oval or oblong lanceolate, flowers pink.

e. Lip lacerate, sepals 20 mm. long.

Pogonia ophioglossoides, p. 370

cc. Lip toothed, sepals 40-50 mm. long.

P. divaricata, p. 370

ddd. Leaves five in a whorl at the top of the stem, petals greenish yellow, sepals slender terete, much elongated, purplish.

Isotria verticillata, p. 371

cc. Flowers less than 15 mm. in diameter, in a spike or raceme.

d. No leaves, whole plant purplish.

e. Lip three lobed.

Corallorhiza maculata, p. 379

cc. Lip entire or margin undulate.

f. Flowers 6-8 mm. long, blooms in Aug.-Sept.

C. odontorhiza, p. 379

ff. Flowers 14 mm. long, blooms in spring.

C. wisteriana, p. 379

dd. Leaves present.

e. Leaves basal, variegated with white lines, forming a sort of mesh work.

Peramium pubescens, p. 376

ce. Leaves not variegated.

f. Flowers not white.

g. Leaf single.

h. At base of scape. *Aplectrum hyemale*, p. 378

hh. About the middle of scape.

Acroanthes unifolia, p. 376

gg. Leaves two.

h. About the middle of scape.

Listera australis, p. 375

hh. At base of scape.

i. Flowers yellowish green.

Leptorchis laesellii, p. 377

ii. Flowers brownish purple. *L. liliifolia*, p. 377

ff. Flowers white, usually in a spirally arranged spike.

g. Leaves oblong lanceolate, 1 dm. long by 10 mm. wide, blooming in spring or early summer.

G. plantaginea, p. 373

gg. Leaves long and grass-like, .7-3.5 dm. long, blooming in late summer or autumn.

h. Flowers in several ranks. *G. cernua*, p. 373

hh. Flowers in a single rank.

i. Scape almost glabrous, 4-7 dm. high.

G. præcox, p. 374

ii. Scape pubescent above, 1.5-5 dm. high.

G. vernalis, p. 374

ggg. Leaves ovate or elliptic, absent at flowering time—late summer or autumn.

h. Plant 2-6 dm. high, lips of flower green, a cluster of tuber-like roots. *G. gracilis*, p. 375

hh. Plant 1.2-2.5 dm. high, lip white, a single tuber-like root. *G. beckii*, p. 375

CYPRIPEDIUM L.

Cypripedium acaule Ait. Moccasin Flower.

Pl. XI, II.

Cypripedium acaule Aiton, Hort. Kew. III: 303. 1789 [North America].—Knieskern 31.—Willis 62.—Rafinesque Med. Fl. I: 144. 1828.—Britton 236.—Keller and Brown 107.

Cypripedium humile Barton Fl. Phila. II: 145. 1818.

Sandy woods throughout the State; frequent.

Fl.—Early May to early June.

Middle District.—Farmingdale, New Egypt, Arney's Mt. (S), Camden, Westville, Washington Park, Orchard (S), Medford (S), Swedesboro, Bridgeton (S).

Pine Barrens.—Manahawkin, Speedwell (S), Jackson, Cedar Brook, Williamstown Jnc. (S), Landisville, Pleasant Mills, Egg Harbor City, Beesley's Pt. (S), Tuckahoe.

Cape May.—Dennisville, Cold Spring, Cape May (OHB).

Cypripedium pubescens Willd. Large Yellow Slipper-Plant.

Cypripedium pubescens Willdenow, Syst. Pl. IV., 143, 1805 [North America].—Willis 62.—Britton 236.—Keller and Brown 108.

Rich woods; frequent in the northern counties, rare and local southward in the Middle district.

Fl.—Early May to late May.

Middle District.—Englishtown (C), Washington Park (KB), Bet. Mullica Hill and Mickleton (H), Swedesboro.

Cypripedium parviflorum Salisb. Small Yellow Slipper-Plant.

Cypripedium parviflorum Salisbury, Trans. Linn. Soc. I: 77. 1791 [Virginia].—Pursh. Fl. Am. Sept. II: 594. 1814.

Rich woods of the northern counties, local. Very rare in the Middle district, only one station recorded in Britton's catalogue on authority of R. W. Brown and no specimen seen.

Middle District.—Keyport (C).

GALEARIS Rafinesque.***Galearis spectabilis (L.). Showy Orchis.**

Pl. XLIV.

Orchis spectabilis Linnæus, Sp. Pl. 943. 1753 [Virginia].—Willis 61.—Britton 233.

Rich woods; common in the northern district and occasional southward in the Middle district.

Fl.—Early May to late May.

Middle District.—Keyport (C), Freehold (C), Bordentown (C), New Egypt, Swedesboro, Sharpstown (H), Oliphant's Mill (H).

PERULARIA Lindley.**Perularia flava (L.). Pale-green Orchis.**

Orchis flava Linnæus, Sp. Pl. 942. 1753 [Virginia].—Nuttall Gen. II. 188. 1818.

Habenaria flava Britton 234.

*The generic name *Galearis* of Rafinesque 1836, has usually been rejected as too near *Galearia* Presl 1830, and *Galcorchis* was proposed by Rydberg as a substitute. There is a tendency now, however, to retain all names possible which are not absolutely identical or differ only in gender terminations, and I think *Galearis* can safely be retained.

Swamps; frequent in the northern district, very rare within our limits. Only one specimen seen.

Toms River (NB).

Fl.—Early June to early July.

GYMNADENIOPSIS Rydberg.

***Gymnadeniopsis integra* (Nutt.). Southern Yellow Orchis.**

Orchis integra Nuttall Gen. II: 188. 1818 [Swamps of New Jersey (=Egg Harbor.)].

Habenaria integra Willis 61.—Britton 234.

?*Gymnadenia flava* Knieskern 30.

Gymnadeniopsis integra Keller and Brown 108.

Pine Barren swamps; very rare and local.

Nuttall's original specimens in the Philadelphia Academy herbarium are labeled "Egg Harbour," which in those days meant Beesley's Point, on Great Egg Harbor. Chas. Pickerring later found the plant at Quaker Bridge, and on August 26, 1863, Chas. F. Parker also collected it there. All these specimens I have examined. Prior to 1856 Dr. Knieskern had collected the plant somewhere in Ocean or Monmouth County, according to his List, although there seems to me some question whether the plant to which he refers was not *Blephariglottis cristata*. This is well known from Dr. Knieskern's territory, and yet he does not mention it. Rev. Saml. Lockwood also reported *C. integra* to Dr. Britton from Allaire. The only recent record that we have is a specimen collected by Mr. Geo. Reddles at Quaker Bridge some ten years ago and identified as this, though unfortunately it was not preserved.

All our efforts to find this orchid have failed, although likely spots in the Pine Barrens have been diligently searched.

Pine Barrens.—Allaire (C), Quaker Bridge (C. Pickering in A. N. S. and C. F. Parker in U. of P.), "Egg Harbor"—Beesley's Pt.

***Gymnadeniopsis clavellata* (Michx.). Green Wood Orchis.**

Orchis clavellata Michaux, Fl. Bor. Am. II: 155. 1803 [Carolina].

Gymnadenia tridentata Knieskern 30.

Habenaria tridentata Willis 61.—A. Brown, Bull. Torrey Bot. Club VII. 114. 1880.—Britton 234.

Gymnadeniopsis clavellata Keller and Brown 108.

Swamps especially in woodland; frequent throughout the State.

Fl.—Late July to mid-August.

Middle District.—Pt. Pleasant, New Egypt, Camden, Mt. Ephraim (P), Medford (S), Lindenwold, Swedesboro.

Pine Barrens.—Toms River (NJ), Forked River, Manchester (NB), Bamber, Waretown, Barnegat, Coxes, Berlin, Clementon, Eighth St. (T), Quaker Bridge, Batsto, Forks of Batsto, Palermo, Sea Isle Inc. (S).

Cape May.—Goshen, Green Creek (S), Dias Creek (S), Cold Spring, Whitesboro (S).

***Gymnadeniopsis nivea* (Nutt.). Snowy Orchis.**

Pl. XLVII.

Orchis nivea Nuttall, Gen. II: 188, 1818 [Betwixt St. Mary's and Satilla River, W. Florida].

Gymnadeniopsis nivea Long, Torreya 1908, 16. Stone, Proc. Acad. Nat. Sci. Phila., 1908, 458.

Open bogs in southern Cape [May County; locally common.

One of the greatest surprises of recent botanical investigations in southern New Jersey was the discovery of this plant by Mr. Bayard Long on July 24, 1907.

It was hard to imagine that in a region so frequently scoured by botanists an undetected and conspicuous orchid had been blooming all these years, and yet such was the case. The explanation probably lies in the fact that the bogs in which the plant grows are off the usual line of travel and directly away from the sea and the salt marshes, which seem always to have attracted the botanists who visited the region. Then, again, the late blooming of this species was doubtless also a factor in concealing its presence, as the usual conspicuous bog flowers are, for the most part, over before it starts to blossom.

The systematic efforts of the members of the Philadelphia Botanical Club to explore all the bogs of this region that were marked on the maps were responsible for discovering the locality, and to Mr. Long is due the credit for recognizing the plant from the leaves and old withered flower stalk. A later visit by Mr. Van Pelt and the writer revealed the plant just beginning to bloom, while on September 4, 1907, it was at its height and was found to be far more plentiful than at first supposed, its white spikes rising above the grass all over the bogs.

The bogs in which this orchid grows seem to be peculiar in their flora, and other species known only from Delaware, southward, occur there commonly, such as *Boltonia asteroides*, *Xyris elata*, *Coelorachis rugosa*, etc. Mr. O. H. Brown informs me that a peculiar white clay underlies this chain of bogs which is not found elsewhere in Cape May County, so far as he is aware.

When examining the State Herbarium at New Brunswick I found a specimen of this orchid from the herbarium of W. H. Leggett labeled "Southern N. J.," with a note by Dr. Britton to the effect that he does not believe it came from New Jersey.

Fl.—Early August to mid-September.

Cape May.—Bogs near Bennett.

BLEPHARIGLOTTIS Rafinesque.

***Blephariglottis cristata* (Michx.). Crested Yellow Orchis.**

Orchis cristata Michaux, Fl. Bor. Am. II. 156. 1803 [Carolina].—Barton, Fl. Phila. II. 138. 1818.

Habenaria cristata Willis, 61.—Britton 234.

Blephariglottis cristata Keller and Brown 109.

Bogs and damp ground; frequent in the Pine Barren and Cape May regions and rare and local in the Middle district, even to Hudson County.

Fl.—Late July to late August.

Middle District.—Gloucester Pt., Griffiths Swamp, Haleyville (P).

Pine Barrans.—Long Branch, Asbury Park (C), Spring Lake (NB), Pt. Pleasant (S), Speedwell (S), Jones Mill (S), Atsion (Bassett), Pleasant Mills (S), Hammonton, Winslow, Pancoast (NB), Egg Harbor City, Beesley's Pt. (S).

Cape May.—Court House (S), Dias Creek (S), Green Creek (S), Nummeytown, Whitesboro (S).

***Blephariglottis ciliaris* (L.). Yellow Fringed Orchis.**

Pl. XLV.

Orchis ciliaris Linnæus, Sp. Pl. 939. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 136. 1818.

Platanthera ciliaris Knieskern 31.

Habenaria ciliaris Willis 61.—Britton 235.

Blephariglottis ciliaris Keller and Brown 109.

Bogs in the Middle and Cape May districts, casually northward (Bergen, Essex and Hudson counties), and occasional in the Pine Barrens; local and not very common.

Fl.—Late July to late August.

Middle District.—Red Bank, Mon. Co. (NB), Lindenwold, Woodbury, Swedesboro.

Pine Barrens.—Forked River (NY), Bamber, Landisville, Hammonton.

Cape May.—Bennett.

***Blephariglottis blephariglottis* (Willd.). White Fringed Orchis.**

Orchis blephariglottis Willdenow, Sp. Pl. IV. 9. 1805 [Pennsylvania (Prob. = N. J.)].—Pursh, Fl. Am. Sept. 385. 1814.—Barton, Fl. Phila. II. 136. 1818.

Platanthera blephariglottis Knieskern 31.

Habenaria blephariglottis Willis 61.—Britton 235.

Blephariglottis blephariglottis Keller and Brown 109.

Bogs, abundant in the Pine Barren and Cape May districts and locally in the Middle district, extending to Bergen, Hudson and Mercer counties.

The White Fringed Orchis impresses the visitor to the Pine Barrens more than any other plant. There is a delicacy and beauty about it that seem to remove it entirely from the class of "wild flowers" and it seems as if it belonged rather with the greenhouse exotics.

Throughout midsummer nearly every boggy spot in the Pine Barrens is decked with the white plumes of this orchid, some of the flower spikes being 15–18 cm. in length.

Between this and the last there is scarcely any difference, except in the matter of color, and when they are dried it is well nigh impossible to tell them apart.

Two hybrids occur in which this species is concerned. *B. bicolor* Rafinesque is *B. blephariglottis* x *B. ciliaris* and has been found at Bamber by Mr. Bayard Long, August 25, 1900.

B. canbyi Ames* (*B. blephariglottis* x *B. cristata*) has been collected a number of times in the Pine Barrens and Cape May peninsula. It varies both in size and color of the flowers. I have it from Cape May Court House and Belleplain.

Fl.—Mid-July to mid-August.

Middle District.—Camden, Red Bank, Paulsboro, Woodbury, Lindenwold, Tomlin (S), Swedesboro, Dividing Creek (S), Haleyville (P).

Pine Barrens.—Long Branch, Asbury Park, Ocean Grove (P), Pt. Pleasant (S), Toms River (S), West Creek (S), Jones Mill (S), Atsion (S), Speed-

* *Rhodora* 1908, 70 [Lewes, Del.]

well (S), Ballenger's Mill (S), Bear Swamp (S), Landisville, Winslow (S), Pleasant Mills (S), Folsom, Egg Harbor City (S), Belleplain (S), Woodbine (S).

Cape May.—Goshen, Court House (S), Whitesboro (S), Bennett (S).

Blephariglottis lacera (Michx.). Green Fringed Orchis. Ragged Orchis.

. PL. XLVI.

Orchis lacera Michaux, Fl. Bor. Am. II. 156. 1803 [Carolina].

Habenaria lacera Willis 61.—Britton 235.

Blephariglottis lacera Keller and Brown 109.

Swamps and bogs frequent in the Northern, Middle and Cape May districts; occasional on the Coast.

Fl.—Late June to late July.

Middle District.—Farmingdale, Pt. Pleasant, Brindletown, Burlington, Pemberton Jnc. (S), Camden (P), Lindenwold (S), Tomlin, Kirkwood, Centerton, Swedesboro.

Pine Barrens?.—Landisville.

Coast Strip.—Holgate's (L), Beach Haven Terrace (L).

Cape May.—Cold Spring, Bennett, Cape May (P).

Blephariglottis grandiflora (Bigel.). Large Purple Fringed Orchis.

Orchis grandiflora Bigelow, Fl. Bost. Ed. II. 321. 1824 [Massachusetts].

Habenaria fimbriata Britton 235.

Blephariglottis fimbriata Keller and Brown 109.

Rich woods and moist clearings: very rare in the Middle district, more frequent northward.

Fl.—Early June to early July.

Middle District.—Camden, Mickleton (H), Swedesboro.

Blephariglottis psycodes (L.). Small Purple Fringed Orchis.

Orchis psycodes Linnæus, Sp. Pl. 943. 1753 [Canada].

Habenaria psycodes Britton 235.

Blephariglottis psycodes Keller and Brown 109.

Open swamps; northern counties frequent, and very rare southward in the Middle district.

Fl.—Mid-July to mid-August.

Middle District.—Freehold (C), Red Bank, Mullica Hill, July, 1891 (H), Swedesboro, River Swamp near Camden, Aug. 1861 (P).

Blephariglottis peramœna (Gray.). Fringeless Purple Orchis.

Habenaria (Platanthera) peramœna Gray, Am. Jour. Sci. 38: 310. 1840 [New York to Virginia].

Blephariglottis peramœna Stone, Bartonian I. 21. 1909.

Open swamps in the upper Middle district in Mercer and Monmouth counties and along the border of the salt marsh in Cape May County; rare and local.

The "Haddonfield" specimen in the Martindale Herbarium* at the Philadelphia College of Pharmacy was one of several found by John Harned, August, 1879, on Coopers Creek, two miles above Stoy's Landing.

Fl.—Mid-July to mid-August.

Middle District.—Haddonfield (CP), Sharon (C).

Cape May.—Court House.

POGONIA Jussieu.

Pogonia ophioglossoides (L.). Rose *Pogonia*.

Pl. XLVIII.

Arethusa ophioglossoides Linnaeus, Sp. Pl. 951. 1753 [Virginia and Canada].

Pogonia ophioglossoides Knieskern 31.—Willis 62.—Britton 233.—Keller and Brown 110.

Open bogs throughout the State, common in the Northern, Pine Barren and Cape May districts, less common and local in the Middle district.

This is a beautiful orchid and one that is generally distributed through the bogs of southern New Jersey, the large pink flowers being very showy. As a rule there is but a single flower on each plant, but in a large bog near Bennett on June 30, 1909, I found them quite frequently two-flowered. Occasionally white flowers occur.

Fl.—Early June to early July, rarely later.

Middle District.—Shark River, Pemberton, Lindenwold (S), Westville, Camden, Swedesboro, Mickleton.

Pine Barrens.—Pt. Pleasant (S), Forked River, Island Heights (NY), Manahawkin, Tuckerton, West Creek, High Bridge (S), Speedwell (S), Albion, Malaga (S), Andrews, Landisville (T), Twelfth St. (T), Hammonton, Prospertown, Brindletown, Bear Swamp, Lakelhurst, Quaker Bridge, Jackson, Atsion, Inskip, Sumner, Cedar Brook.

Coast Strip.—N. Beach Haven (L), Spray Beach (L), Seaside Park.

Cape May.—Cold Spring, Bennett (S), Cape May.

* cf. Torr. Bull.:XX. 98. Isaac C. Martindale (1842-1895) an active botanist of Camden, N. J., and an authority on the plants of the southern part of the State.

***Pogonia divaricata* (L.). Spreading *Pogonia*.**

Arethusa divaricata Linnæus Sp. Pl. 951. 1753 [North America].

Pogonia divaricata Gray, Man. Ed. V. 507. 1867.—Willis 62.—Britton 233.—Keller and Brown 110.—Stone, Bartonian II., 26. 1910.

Open swampy or boggy spots, Pine Barren and Cape May districts, very rare and local.

This splendid Orchid was apparently first collected in the State by D. C. Eaton, at Batsto (in 1860?), and again July 7, 1864, at Quaker Bridge, by W. H. Leggett. From that time on there is no evidence of its having been found in New Jersey until June 30, 1909, when the writer discovered a small colony of plants near Bennett, Cape May Co., N. J. These specimens were not growing out in the wet bog where *P. ophioglossoides* abounded, but in a dryer spot near the edge, well concealed among various sedges, grasses, etc. They bloomed again in 1910 and produced seed, although the farmer's scythe passed within a couple of feet of them and they narrowly escaped being transformed into hay.

Fl.—June 30 and July 7.

Pine Barrens.—Batsto (C), Quaker Bridge (NB).

Cape May.—Bennett.

ISOTRIA Rafinesque.

Isotria verticillata* (Willd.). Whorled *Pogonia*.

Pl. XLIX.

Arethusa verticillata "Muhl.," Willdenow Sp. Pl. IV.:81. 1805 [Pennsylvania].

Pogonia verticillata Knieskern 31.—Willis 62.—Britton 233.

Isotria verticillata Keller and Brown 110.

Low woodlands; frequent in the northern counties and less common in the Middle district. Very rare in the Pine Barrens.

This curious species flowers before the leaves are fully developed. The flower, though rather inconspicuously colored—green and purplish brown—is striking on account of its peculiar structure, the long terete sepals resembling the appendages on the mouth of a cat-fish.

*The *Triphora trianthophora* recorded in Keller and Brown's list on the authority of Miss Cora S. Ware (from road beyond Elmer) cannot be verified, and is pretty certainly based on an error of identification. No specimen was preserved, and Miss Ware cannot remember who reported the plant to her. It was thought to have been collected in June, while *Triphora* does not bloom until August, and is altogether unlikely in the coastal plain.

The whorl of leaves later in the summer would easily be mistaken for a young plant of *Medeola* in which only one whorl had been developed.

Fl.—Mid-May to late May.

Middle District.—Keyport (C), Florence (C), Camden, Westville, Haddonfield (S), Mickleton (H), Wenonah (KB), Red Bank, Clarksboro (H), Yorktown, Swedesboro (CDL), Woodstown (KB), Salem (C).

Pine Barrens.—Hammononton (NB), Ancora (KB).

ARETHUSA L.

Arethusa bulbosa L. *Arethusa*.

Arethusa bulbosa Linnæus, Sp. Pl. 950. 1753 [Virginia and Canada].—Barton Fl. Phila. II: 141. 1818.—Knieskern 31.—Willis 62.—Britton 232.—Keller and Brown 110.

Open bogs; occasional in the northern counties and Middle district, locally common in the Pine Barrens and Cape May peninsula.

Of the three large flowered pink bog orchids of the Pines—*Pogonia*, *Limodorum* and *Arethusa*—the last I think easily holds first place. There are no leaves at flowering time, the single narrow blade appearing later on, and the whole plant is suffused with pink and crimson. The bulb seems to rest loosely in the sphagnum and can usually be easily lifted up, too easily for the safety of the species.

Though rare and local in some spots, in others it is exceedingly abundant, and I have seen hundreds of the beautiful blossoms decking the bogs near Bay Head on Decoration Day, which marks the height of its flowering season.

Fl.—Mid-May to mid-June.

Middle District.—Between Pemberton and New Lisbon (NB), Kaighns Pt., Woodbury (KB), Griffith's Swamp, 10 miles east Mickleton, 2 miles east Sewell (S), Daretown (KB).

Pine Barrens.—Belmar (P), Pt. Pleasant, Farmingdale, Toms River, Forked River, Tuckerton, Whittings, Quaker Bridge (Bassett), Pleasant Mills, Hammononton (KB), Egg Harbor City, Tuckahoe, Richland (H).

Cape May.—Cold Spring, Cape May (S).

LIMODORUM L.

Limodorum tuberosum L. Grass-pink.

Pl. XXXIII., Figs. 4, 5.

Limodorum tuberosum Linnæus, Sp. Pl. 950. 1753 [North America].—Keller and Brown 111.

Calopogon pulchellum Knieskern 31.—Willis 62.

Calopogon tubersum and var. *albiflorus* Britton 232.

Open bogs throughout the State; most plentiful in the Pine Barrens and northern counties.

The *Limodorum* seems to be less restricted to the bogs than either the *Arethusa* or *Rose Pogonia*, and its beautiful cluster of crimson blossoms will be found in every little damp sandy spot where *Drosera filiformis* and *Utricularia cleistogama* like to grow. As we drive over the long white sandy roads in early July these brilliant banners are almost the only touch of bright color to be seen.

Fl.—Early June to late July.

Middle District.—Shark River, Pt. Pleasant, New Egypt, Pemberton (NB), Lindenwold, Lawnside (S), Sicklerville (S), Mickleton, Dividing Creek (S).

Pine Barrens.—Toms River (S), Forked River, Lakehurst, West Creek, Tuckerton, Speedwell, White Horse, Atsion, Atco, Cedar Brook, Jackson, Bear Swamp (S), Albion, Williamtown Jnc., Winslow (S), Hospitality Bridge, 8th St., Richland, Landisville, Quaker Bridge, Hammonton, Egg Harbor City, Mays Landing, Woodbine, Belleplaine (S).

Cape May.—Dennisville (OHB), Cold Spring.

Coast Strip.—Surf City (L), Spray Beach (L), N. Beach Haven (L).

GYROSTACHYS Persoon.*

Gyrostachys plantaginea (Raf.). Wide-leaved Ladies' Tresses.

Neottia plantaginea Rafinesque, Am. Mo. Mag. II. 206. 1818 [Fishkill, N. Y.].
Speiranthes latifolia Britton 231.

Reported from three localities in Sussex and Warren Counties in Britton's Catalogue. Known in our region only from Palermo in the coast strip, where it was collected by Messrs. S. S. Van Pelt and C. S. Williamson; and from the Delaware shore above Burlington, where Mr. Isaac Burk found it June 22, 1873.

Fl.—Late May to late June.

Coast Strip.—Palermo, Above Burlington (P).

Gyrostachys cernua (L.). Nodding Ladies' Tresses.

Pl. LII.

Ophrys cernua Linnæus, Sp. Pl. 946. 1753 [Virginia and Canada].
Speiranthes ceruna Knieskern 31.—Willis 61.—Britton 231.

* Mr. House advocates the substitution of *Ibidium* for this genus, on the ground that *Gyrostachys* was not properly published. The citation of several species is really far better than a diagnosis, and the making of actual combinations with the new generic name a trivial matter, which does not affect its status. By usage customary among zoologists the validity of *Gyrostachys* could not be questioned. (cf. House, Bull. Torr. Bot. Club 32, 380—1905.)

Damp ground; frequent throughout the State, least abundant in the Pine Barrens.

Fl.—Early September to mid-October.

Middle District.—New Egypt, Camden, Medford (S), Orchard (S), Hadonfield, Lindenwold (S), Clementon, Swedesboro, Woodbury (P).

Pine Barrens.—Forked River, Waretown, Whitings, Atco, Pleasant Mills, Hammonton (Bassett), Egg Harbor City, Sea Isle Inc. (S).

Cape May.—Cold Spring.

Coast Strip.—Sandy Hook (NB), Seaside Park (S), Coxes, Barnegat City (L), Harvey Cedars (L), Ship Bottom (L), Spray Beach (L), Palermo (S), Ocean View (S).

***Gyrostachys præcox* (Walt.). Grass-leaved Ladies' Tresses.**

Limodorum præcox Walter, Fl. Cor. 221. 1788 [South Carolina, probably Santee River].

Speiranthes graminca var. *præcox* Britton 231.

Gyrostachys præcox Keller and Brown 111.

Swamps and damp ground; frequent in the Pine Barren, Cape May and Coast districts, less so in the Middle district.

Besides *G. vernalis* we have a larger species of Ladies' Tresses growing in wet bogs instead of damp sand and blooming later. Structurally it differs in having the stem nearly glabrous above. Mr. Oakes Ames in his monograph* has identified specimens from several of our localities as *G. præcox*, and we have so regarded it. Dr. John K. Small, however, regards typical specimens from Bennett as *G. vernalis*. As I do not feel able to unite the two forms, I let them stand subject to further study.

Fl.—Early August to late September.

Middle District.—Seven miles west of Mickleton.

Pine Barrens.—Atsion, Speedwell, Hospitality Br., Crowleystown, Quaker Bridge (P).

Cape May.—Bennett.

***Gyrostachys vernalis* (Engelm. and Gray.).**

Speiranthes vernalis Engelmann and Gray, Bost. Jour. Nat. Hist. V. 236. 1845 [Galveston, Texas].

Rather frequent along the coast strip and rarely in the Pine Barrens.

Fl.—Late June—early August.

* Orchidaceae Fasc. I., pp. 113-156.

Pine Barrens.—Winslow Inc., Woodbine.

Coast Strip.—Toms River, Avon, Absecon, Atlantic City, Ocean City, Longport, Wildwood, Anglesea, Cold Spring, Spray Beach (L), Beach Haven Terrace (L), Barnegat City (L).

Gyrostachys beckii (Lindley.). **Beck's Ladies' Tresses.**

Spiranthes Beckii Lindley, Gen. and Sp. Orchids. 472. 1840 [Massachusetts, New Jersey and Delaware].—Willis 61.—Britton 232.

Gyrostachys simplex Keller and Brown III.

Frequent in sandy ground throughout our limits and north to Bergen Co.

Fl.—Mid-July to mid-September.

Middle District.—Shark River (NB), Keyport (C), Wrightstown (C), Brindletown, Camden (P), Cooper's Creek, Lindenwold, Clarksboro Franklinville (C), Swedesboro, Bridgeton, Dividing Creek.

Pine Barrens.—Manahawkin, Speedwell (S), Atsion (S), Clementon (S), Taunton (S), Hammonton (Bassett), Egg Harbor City, Absecon (S), Palermo (S).

Cape May.—Court House (S), Cold Spring (OHB), Bennett, Cape May (KB).

Gyrostachys gracilis (Bigel.). **Slender Ladies' Tresses.**

Plate LI.

Neotia gracilis Bigelow Fl. Bost. Ed. II. 322. 1824 [Dry, hilly woods, Boston].

Speiranthes gracilis Knieskern 31.—Willis 61.—Britton 232.

Frequent in the northern counties according to Britton, common along the coastal strip, and occasional in the lower Middle and Cape May districts. Always near the coast or bay shore.

Fl.—Early July to mid-September.

Middle District.—Long Branch, Camden (P), Gloucester (P), English-town (NY), Bridgeton, Beaver Dam, Dividing Creek.

Coast Strip.—Manahawkin, Barnegat City (L), West Creek, Palermo, Mays Landing (S), Cape May Court House.

LISTERA R. Brown.

Listera australis Lindl. **Southern Twayblade.**

Listera australis Lindley, Gen. and Sp. Orch. 456. 1840 [Carolina].—Willis 61.—Britton 231.—Keller and Brown 112.

Epipactis convallarioides Parsh Fl. Amer. Sept. II. 591. 1814.

Listera cordata Nuttall Gen. II. 191. 1818.—Barton Fl. Phila. II. 140. 1818.

Very rare and local in the Middle and Pine Barren districts; only known from three stations.

In 1818 Barton states that the plant is "very rare in the dark swampy wood bordering a road leading from Kaighn's Point to the Woodbury road," and specimens in the Philadelphia Academy Herbarium are labelled "Camden to Kaighn's Pt." and "Below Gloucester Pt." Just how many stations were known to the older botanists I cannot say, but they all seem to have been in the immediate vicinity of Camden, and all seem to have been covered by the encroachment of the city and adjoining towns. It was, therefore, a matter of no small interest when Mr. Geo. W. Bassett, on June 1, 1908, found a specimen of *Listera* in a cedar swamp on Alberson's branch, five miles north of Hammonton, an entirely new locality. Possibly further search in cedar swamps will result in its discovery elsewhere.

Fl.—Probably very early. Specimen May 24 has capsules dehiscent and broken up.

Middle District.—Camden to Kaighn's Pt. below Gloucester Pt.

Pine Barrens.—Five mi. N. Hammonton.

PERAMIUM Salisbury.

Peramium pubescens (Willd.). Rattlesnake Plantain.

Pl. L.

Neottia pubescens Willdenow, Sp. Pl. IV. 76. 1805 [Canada-Florida.]

Goodyera pubescens Britton 232.

Peramium pubescens Keller and Brown 112.

Rich woods of the northern counties, frequent, and less common southward in the upper Middle district and in southern Cape May County.

Fl.—Late July to early August.

Middle District.—Asbury Park, Allentown, New Egypt, Brindletown, Birmingham, Kirkwood (C), Medford (S), Camden (P), Gloucester (P), Mickleton (H).

Pine Barrens.—Arcola, Near Hammonton (Bassett).

Cape May.—Bennett (S), Cold Spring (OHB).

ACROANTHES Rafinesque.

Acroanthes unifolia (Michx.). Green Adder's-Mouth.

Malaxis unifolia Michaux, Fl. Bor. Am. II. 157. 1803 [Carolina-Florida].

Malaxis ophioglossoides Nuttall Gen. II. 196. 1818.—Barton Fl. Phila. II. 143. 1818.

Microstylis unifolia Britton 229.

Acroanthes unifolia Keller and Brown 112.

Woods; Northern and upper Middle districts rare and local, also once in the Pine Barrens.

Barton records it from three miles north of Woodbury, and Mr. Lippincott has collected it at a station near Swedesboro, in July, 1890, 1891 and 1894.

Fl.—Early July to early August.

Middle District.—Red Bank Mon. Co. (C), Keyport (C), Swedesboro (CDL), Hammonton (A. N. S. coll. by G. W. Bassett July 13, 1879).

LEPTORCHIS Thouars.

Leptorchis liliifolia (L.). Large Twayblade.

PL. XLIII.

Ophrys liliifolia Linnæus, Sp. Pl. 946. 1753 [Virginia].

Liparis liliifolia Knieskern 31.—Willis 62.—Britton 229.

Leptorchis liliifolia Keller and Brown 112.

Frequent in woods of the northern counties and rare southward in the Middle district.

Fl.—Late May to late June.

Middle District.—Keyport (C), New Egypt, Bordentown (C), Camden, Gloucester (P), Auburn, Medford (S), Mickleton (H), Oliphant's Mill (KB), Riddleton (KB).

Pine Barrens?—Manchester (C).

Cape May.—Cold Spring (OHB).

Leptorchis loeselii (L.). Loesel's Twayblade.

Ophrys Loeselii Linnæus, Sp. Pl. 947. 1753 [Suecia and Borussia].

Liparis Loeselii Britton 230.

Leptorchis Loeselii Keller and Brown 112.—Crawford, Barton I. 18. 1909.—Stone do. 20.

Locally in the Northern and upper Middle districts; also rare on the coast to southern Cape May County and once in the Pine Barrens.

Fl.—Late May to late June.

Middle District.—Browns Mills (NB), Medford (S), Kirkwood (KB), Mickleton (H).

Pine Barrens.—Hanover (C), Atsion.

Coast Strip.—Surf City (L), Beach Haven Terrace (L), Longport, Anglesea (OHB).

Cape May.—Cold Spring (S).

TIPULARIA Nuttall.

Tipularia discolor (Pursh.). Crane-fly Orchis.

Orchis discolor Pursh, Fl. Amer. Sept. II. 586. 1814 [Pine Barrens, N. J. to S. C.].

Tipularia discolor Willis 62.

Tipularia unifolia Britton 231.—Keller and Brown 113.—Van Pelt, *Bartonia* I. 25. 1909.

Rare and local in woods of the Northern and Middle districts and in the lower Cape May peninsula.

This curious orchid was found in lower Cape May County a number of years ago by Mr. Joseph Crawford, but was not discovered again until detected by Mr. O. H. Brown, who has in the last few years found it at a number of scattered stations in dark oak and pine woods of the lower third of the peninsula. The single leaf arises in autumn and persists throughout the winter, but perishes before the flowers appear. The absence of any foliage and the spidery character and obscure coloring of the flowers makes it an exceedingly difficult plant to detect.

Pursh's type locality was Pine Barrens of New Jersey, but he probably used the term loosely.

Fl.—Early July to early August.

Middle District.—Freehold (C), Birmingham, Swedesboro.

Cape May.—Road to Fishing Creek (OHB), Cape May, N. of New England Creek.

APLECTRUM Nuttall.

Aplectrum hyemale Muhl. Adam-and-Eve, Putty-root.

Aplectrum hyemale "Muhlenberg," Willdenow Sp. Pl. 4. 107. 1805 [Pennsylvania].

Aplectrum spicatum Britton 230.—Keller and Brown 113.

Rather rare and local in the Northern district and collected at Swedesboro, Salem County, June 26, 1892, by Mr. Charles D. Lippincott, the only record for the region covered by this list. A close ally of the preceding and almost as difficult to discover. The leaf develops in late summer, persists over winter, but perishes shortly after the flowering season.

Fl.—Late May to early June.

Middle District.—Swedesboro.

CORALLORHIZA R. Brown.

Corallorhiza wisteriana Conrad. **Wister's Coral-root.**

Corallorhiza Wisteriana Conrad, Jour. Acad. Nat. Sci. Phila. VI. 145. 1829
[Schuylkill below Falls and Wissahickon Creek, Phila.].

Rare in woodlands of the Middle district. Known from only one station. Named in honor of its discoverer, Mr. Charles J. Wister (1782-1865), an early Philadelphia botanist.*

Fl.—Late April to early June.

Middle District.—Swedesboro.

Corallorhiza odontorhiza (Willd.). **Small Coral-root.**

Pl. LIII.

Cymbidium Odontorhiza Willdenow, Sp. Pl. IV. 110. 1805 [Canada Virginia].

Corallorhiza Odontorhiza Nutt. Gen. II. 197. 1818.—Barton, Fl. Phila. II. 144. 1818.—Britton 230.—Keller and Brown 112.

Frequent in woods of the northern counties and rare and local southward in the Middle District, also in southern Cape May County.

Fl.—Mid-August well into September, or even later.

Middle District.—New Egypt, Medford (S), Camden (P), Gloucester (P), Mickleton (H), Swedesboro (CDL), Mullica Hill (NB), Woodbury Road, Sewell (C).

Cape May.—Cold Spring.

Corallorhiza maculata Raf. **Large Coral-root.**

Corallorhiza maculata Refinesque, Amer. Mo. Mag. II. 119. 1817 [Flatbush, L. I.].—Britton 230.—Keller and Brown 114.

Rather frequent in woods of the northern counties. Rare southward in the Middle district.

Fl.—Late July into September.

Middle District.—New Egypt, Camden (NB).

* Cf. Gardner's Monthly, VII., 271.

Sub-Class II. DICOTYLEDONES.

Key to the Groups.

- a. Insectivorous plants, usually somewhat suffused with crimson.
 - b. Leaves cup-like, lined on the inside with reflexed bristles. *Sarraceniaceæ*, p. 467
 - bb. Leaves slender; covered with glandular, sticky hairs. *Droseraceæ*, p. 467
- aa. Parasitic plants.
 - b. Growing on the branches of trees, yellowish-green with inconspicuous flowers and globular, somewhat translucent, white berries. *Loranthaceæ*, p. 416
 - bb. Growing from the roots of trees, shrubs or herbs, devoid of green coloring.
 - c. Corolla of 4-5 separate petals, plant white or yellowish, somewhat tinged with pink, resembling a fungus. *Monotropaceæ*, p. 611
 - cc. Corolla tubular, more or less two-lipped, plant brown or yellowish. *Orobanchaceæ*, p. 694
 - bbb. Growing on bushes or herbs, a trailing vine with naked orange stem. *Cuscutaceæ*, p. 654
- aaa. Plants neither insectivorous nor obviously parasitic.
 - b. Plants aquatic or semi-aquatic; floating, submerged or creeping on mud. p. 380
 - bb. Plants with woody stems, *i. e.*, trees, shrubs and woody climbing vines. p. 381
 - bbb. Plants with herbaceous stems, *i. e.*, herbs and vines with herbaceous stems. p. 385

AQUATIC OR SEMI-AQUATIC DICOTYLEDENOUS PLANTS.

- a. Some or all of the leaves entire, undivided, floating on the surface of the water.
 - b. Leaf-blades at least 25 mm. in length, often much more.
 - c. Flowers on separate pedicels, large or medium sized, white, yellow or purplish. *Nymphaeaceæ*, p. 443
 - cc. Flowers small, in a cluster at the base of the floating leaf; white or yellow. *Limnanthemum*, p. 644
 - ccc. Flowers small, in a short, erect spike, pink. *Polygonum*, p. 419
 - bb. Leaves small, much less than 25 mm. long, flowers minute, greenish. *Callitriche*, p. 529
- aa. None of the leaves floating on the surface, most of the plant submerged, leaves finely divided, usually into linear or filiform segments.
 - b. Leaf-segments bearing little bladders; flowers conspicuous yellow or purple, irregular and spurred, raised above the surface, several on a slender scape. *Utricularia*, p. 688
 - bb. No bladders present.

c. Leaves whorled around the stem, flowers minute, greenish.

d. Leaves about 1 mm. broad at the base, branching and only the terminal divisions filiform, flowers sessile, axillary.

Ceratophyllum, p. 446

dd. Leaves filiform throughout, except on a stalk which rises above the surface, bearing minute greenish flowers and small lacerate-toothed leaves.

Myriophyllum, p. 587

cc. Leaves not in whorls.

d. Flowers single with showy white or yellow petals, 5-8 mm. long.

Ranunculaceæ, p. 448

dd. Flowers small, greenish, whorled on an erect hollow stalk.

Hottonia, p. 630

aaa. Plant growing in water or creeping on the mud, flowers small and inconspicuous.

b. Leaves uniform or rounded, 4-20 mm. broad, flowers axillary toward the end of the stem, brownish with red anthers.

Chrysosplenium, p. 472

bb. Leaves opposite spatulate entire, 12-25 mm. long, flowers axillary.

Isnardia, p. 580

bbb. Leaves alternate lanceolate, 20-50 mm. long, sharply serrate or incised pinnatifid.

Proserpinaca, p. 586

bbbb. Leaves minute, oblonge linear, flowers very minute.

c. Leaves opposite.

d. Stem slender, leaves lanceolate, no perianth.

Callitriche, p. 529

dd. Stem stout, leaves nearly orbicular, petals and sepals present.

Elatine, p. 558

ddd. Plant fleshy, leaves oblong. 8-15 mm. long.

Glaux, p. 633

cc. Leaves alternate, divided into several short, remote, linear lobes.

Myriophyllum, p. 587

bbbb. Leaves (or sterile stems) terete or widening slightly into a blade, 2-8 mm. high, erect from the trailing stem.

c. Flowers in peduncled umbels.

Lilaeopsis, p. 598

cc. Flowers single on slender pedicels.

Limosella, p. 681

ccc. Flowers sessile in a slender spike higher than the terete sterile stems.

Myriophyllum, p. 587

TREES, WOODY SHRUBS OR WOODY VINES.

a. Prostrate or low shrubby plants, less than 3 dm. in height.

b. Stem trailing.

c. Leaves oval or nearly orbicular, thick evergreen, flowers delicate pink, salver-shaped.

Epigæa, p. 619

cc. Leaves 4-8 mm. long, narrowly oblanceolate, awl-pointed flowers, star-like, white.

Pyxidanthra, p. 629

ccc. Leaves 6-17 mm. long, linear oblong, whitish below, corolla 4-parted, petals reflexed, white or pinkish.

Oxycoccus, p. 677

cccc. Leaves 12-25 mm. long, spatulate, flowers urn-shaped, pinkish or white.

Arctostaphylos, p. 621

- cccc. Leaves 3-5 foliate, stem prickly, flowers white. *Rubus*, p. 476
- bb. Stem erect.
- c. Leaves linear, 4-6 mm. long, no perianth, stamens purple. *Corema*, p. 530
- cc. Leaves oval or obovate, 20-30 mm. broad, corolla white, urn-shaped. *Gaultheria*, p. 620
- ccc. Leaves 3-foliate, stem not prickly, flowers small, greenish. *Rhus*, p. 536
- aa. Woody climbing vines.
- b. Flowers large, tubular, orange, leaves pinnate. *Tecoma*, p. 695
- bb. Flowers white, leaves 3-foliate, fruit long-plumose. *Clematis*, p. 454
- bbb. Flowers small, greenish.
- c. Leaves 3-foliate. *Rhus*, p. 536
- cc. Leaves 5-foliate. *Psedera*, p. 548
- ccc. Leaves lobed.
- d. Fruit "hops." [*Humulus*]*
- dd. Fruit "grapes." *Vitis*, p. 546
- cccc. Leaves oval. Fruit round orange pods, splitting and displaying red seeds. *Celastrus*, p. 543
- aaa. Upright trees or shrubs.
- b. Leaves pinnate or digitate.
- c. Stem prickly.
- d. Leaves 3-5 foliate, fruit a many-seeded berry, flowers white, showy shrubs. *Rubus*, p. 476
- dd. Leaves 5-9 foliate, fruit a pod containing black seeds, flowers inconspicuous. *Zanthoxylum*, p. 518
- ddd. Leaves 7-15 foliate, fruit a flat pod, flowers white papilionaceous in a pendant raceme. *Robina*, p. 495
- dddd. Leaves about 24 foliate, leaflets small, less than 1 in. (25 mm.) long, fruit a flat pod 8-15 ins. (2-4 dm.) long. [*Gleditsia triacanthos*]†
- cc. Stem not prickly.
- d. Leaves digitate, 5-foliate. [*Æsculus hippocastanum*]‡
- dd. Leaves 3-foliate.
- e. Entire, fruit a flat winged seed. *Ptelea*, p. 519
- ee. Freely and regularly serrate, fruit in a bladder-like bag; a shrub. *Staphylea*, p. 543
- ccc. Coarsely toothed on terminal half, fruit a samara. *Acer*, p. 543
- cccc. Several deep irregular lobes, fruit globular white berries, shrubs or small trees. *Rhus*, p. 536
- ddd. Leaves 5-11 foliate.
- c. Trees with small greenish flowers in catkins or clusters.
- f. Leaves sharply and regularly serrate, fruit a hard nut enclosed in a thick hull. *Hicoria*, p. 397
- ff. Leaves obscurely or bluntly serrate, fruit a samara. *Fraxinus*, p. 635

* Hope Vine, escaped from cultivation.

† Honey Locust Tree, escaped.

‡ Horse Chestnut, escaped.

- cc. Shrubs with small white flowers in dense cymes, developing black, juicy berries. *Sambucus*, p. 708
- dddd. Leaves 11-17 foliate.
- e. Leaves entire, fruit a samara. [*Ailanthus glandulosus*]*
- ee. Leaves serrate.
- f. Fruit a dense cluster of pubescent seeds (usually crimson red). *Rhus*, p. 536
- ff. Fruit a hard nut inclosed in a hull. *Juglans*, p. 397
- bb. Leaves lobed or coarsely toothed.
- c. Lobing irregular, some leaves lobed and some not, often a sinus on one side and not on the other.
- d. Leaves very rough, fruit a compound berry. [*Broussonetia papyrifera*]†
- dd. Leaves glabrous, fruit a cluster of stalked berries. *Sassafras*, p. 459
- cc. Lobing on both sides of each leaf and more or less symmetrical.
- d. Truncate at the end (mid vein terminating at the bottom of a sinus not at the extremity of a lobe). *Liriodendron*, p. 448
- dd. Leaf more or less star-shaped, with 3-5 acute lobes, lower pair often much smaller than the others.
- e. Margin finely and regularly serrate. *Liquidambar*, p. 474
- cc. Margin irregularly serrate.
- f. Flowers reddish crimson, appearing before the leaves. *Acer*, p. 543
- ff. Flowers appearing after the leaves are expanded, small, white, in dense cymes. *Viburnum*, p. 708
- ddd. Leaf with three short obtuse lobes, irregularly crenate.
- e. Flowers white, in umbels. *Opulaster*, p. 477
- ee. Flowers greenish solitary. *Ribes*, p. 473
- dddd. Leaf lanceolate, pinnatifid; low, sweet-scented shrub, staminate flowers in catkins. *Comptonia*, p. 396
- dddd. Leaves with several obtuse or acute lobes on each side, fruit an acorn, staminate flowers in catkins. *Quercus*, p. 404
- dddddd. Leaves triangular, narrowed at the base, coarsely toothed at the end, seeds with long white down. Coastal. *Baccharis*, p. 764
- bbb. Leaves not lobed.
- c. Entire.
- d. Reniform orbicular.
- e. Flowers large, bell-shaped, white, spotted within, fruit a cylindrical pod. [*Catalpa bignonioides*]‡
- cc. Flowers pink, papilionaceous, pet flat. *Cercis canadensis*, p. 493
- dd. Ovate.
- e. Opposite.
- f. Flowers white in terminal cymes, petals short.
- g. Petals 4. *Cornus*, p. 601

* *Ailanthus* Tree introduced from Asia and frequently escaping.

† Paper Mulberry escaped in some places.

‡ *Catalpa* Tree, escaped from cultivation.

- gg. Petals 5. *Viburnum*, p. 708
- ff. Flowers white, in loose drooping panicles, petals long and slender. *Chionanthus*, p. 636
- ee. Whorled on small branchlets or scattered and alternate.
- f. Fully developed leaves at least 50 x 25 mm.
- g. Flowers small, fruit a berry.
- h. Small branches swollen at each joint, berry black, nearly sessile. *Dirca*, p. 574
- hh. Joints not swollen.
- i. Fruit blue, pedicelled. *Nyssa*, p. 603
- ii. Fruit red sessile, flowers early, before the leaves. *Benzoin*, p. 460
- iii. Flowers in cymes, white, fruit blue. *Cornus*, p. 601
- gg. Flowers large, showy.
- h. White, fruit cone-like, with red seeds hanging from it by threads. *Magnolia*, p. 446
- hh. Maroon, fruit fleshy, cylindrical, banana-like. *Asimina*, p. 448
- hhh. Pink or white, fruit a dry dehiscent capsule. *Ericaceæ*, p. 612
- ff. Fully developed leaves less than 50 x 25.
- g. Flowers white, bell-like, or pink, cup-shaped. *Ericaceæ*, p. 612
- gg. Acorn bearing tree, flowers in catkins. *Quercus*, p. 404
- eee. Whorled at intervals down the stem.
- f. Flowers white, in globular masses. *Cephalanthus*, p. 702
- ff. Flowers purple, in axillary whorls. *Decodon*, p. 575
- cccc. Leaves scattered along the stem, not opposite. *Salix*, p. 392
- cc. Leaves undulate or sinuate crenate.
- d. Flowers with linear twisted petals, blooming in autumn when the leaves are falling. *Hamamelis*, p. 473
- dd. Flowers small without petals, staminate in catkins, fruit an acorn. *Quercus*, p. 404
- ccc. Leaves or some of them slightly crenate at the tip; fruit clusters of sessile wax-covered berries. *Myrica*, p. 395
- cccc. Leaves regularly, finely or remotely serrate or dentate.
- d. Leaves oblique at base, and assymetric, ovate or cordate.
- e. Flowers attached to a membranaceous bract, petals cream colored, fruit a hard green, globular berry. *Tilia*, p. 548
- cc. Flowers inconspicuous greenish, not attached to a bract.
- f. Fruit a many-seeded fleshy berry. *Morus*, p. 414
- ff. Fruit a globular rather dry berry. *Celtis*, p. 413
- fff. Fruit a small winged seed. *Ulmus*, p. 412
- dd. Leaves symmetrical at base, or nearly so, not oblique, shape varied, lanceolate to obovate, oval or deltoid.
- c. No petals.
- f. All the flowers in short, downy catkins, erect or pendant, seeds copiously silky with long white hairs. *Salicaceæ*, p. 390

ff. Staminate flowers in pendant, pistillate in erect catkins,
leaves finely and closely serrate. *Betulaceæ*, p. 399

fff. Staminate flowers only, in catkins, fruit inclosed in a bur.
Fagaceæ, p. 402

cc. Petals present.

f. Separate from one another.

g. Stamens 4-5.

h. Flowers small, greenish, scattered along the
stem or in small racemes.

i. Berries naked, red or black. *Ilicaceæ*, p. 539

ii. Berries red, enclosed in a red or orange
splitting pod. *Celastraceæ*, p. 542

lih. Flowers white.

i. In slender elongated terminal racemes.

Itea, p. 472

ii. In umbel-like clusters forming a terminal
corymb. *Ceanothus*, p. 546

gg. Stamens 8-10, flowers white.

h. In flat terminal cymes. *Hydrangea*, p. 472

lih. In long terminal spike-like racemes, fragrant.

Clethra, p. 608

ggg. Stamens, numerous, petals five, white or pink.

h. Fruit a follicle or achene, sometimes forming
a compound berry. *Rosaceæ*, p. 475

lih. Fruit apple-like with a central "core" contain-
ing seeds. *Pomaceæ*, p. 486

lihli. Fruit plum or cherry-like containing a hard
seed. *Drupaceæ*, p. 490

ff. Petals united.

g. Leaves opposite, flowers small, white, in flat cymes or
yellow and tubular. *Cabrifoliaceæ*, p. 707

gg. Leaves alternate, flowers pink or white, bell-shaped,
or tubular with flaring tips, or round cup-shaped.

Eriaceæ, p. 612

HERBS OR HERBACEOUS VINES.

a. No leaves.

b. Plants consisting of branched, jointed, cylindrical, fleshy stems,
flowers inconspicuous, inhabitants of salt marshes. *Salicornia*, p. 430

bb. Plants consisting of irregular, oval, flattened joints, armed with
spines; and large, showy yellow-petalled flowers. *Opuntia*, p. 573

aa. Leaves present.

b. Neither petals nor sepals present.

c. Flowers several, minute, contained in an involucre, the sinuses of
which bear glands often with petal-like appendages. Staminate
consist of a single stamen and are placed around the inside of the
involucre. Pistillate flower central and exerted in fruit. Plants
with milky juice. *Euphorbia*, p. 527

cc. Flowers not enclosed in an involucre.

- d. Flowers white in a long, feathery cylindrical raceme.
 - e. Leaves ovate, acuminate. *Saururus*, p. 390
 - ee. Leaves pinnately compound. *Ranunculaceæ*, p. 448
- dd. Flowers similar in an open white or greenish panicle.
 - Thalictrum*, p. 458
- ddd. Flowers minute, greenish, in a dense terminal spike or axillary clusters.
 - Acnida*, p. 434
- bb. Sepals present; (petals, if present, very minute, and flowers small, greenish and inconspicuous).
 - c. Flowers conspicuous, sepals petal-like, white, yellow or blue.
 - Ranunculaceæ*, p. 448
 - cc. Flowers in long, slender, terminal spike, white.
 - Sanguisorba*, p. 484
 - ccc. Flowers one or several, purplish at the base of the stem, often buried among dead leaves, etc. *Aristolochiaceæ*, p. 418
 - cccc. Flowers pink, white or greenish, or tinged with crimson, seeds usually three-angled or three-winged, in terminal racemes or axillary spikes or racemes. Joints of the stem covered by scarious, sheath-like stipules.
 - Polygonaceæ*, p. 419
 - ccccc. Flowers greenish white or yellowish green, 3mm. broad or more.
 - d. In a flat terminal cyme, plant 3-6 dm. high.
 - e. Leaves serrate. *Penthorum*, p. 470
 - ee. Leaves entire. *Comandra*, p. 418
 - dd. In long, cylindrical, pendant racemes, in fruit, round black berries with crimson juice; plant 6-9 ft. high.
 - Phytolacca*, p. 343
 - cccccc. Flowers greenish or tinged with red in a few species, inconspicuous and often minute, never 3 mm. broad; in open panicles, or dense heads, spikes or clusters; terminal or axillary, or both.
 - d. Plants erect.
 - e. Leaves entire.
 - f. Plants less than 3 dm. high.
 - g. Leaves delicate sessile or nearly so, less than 25 mm. long. *Caryophyllaceæ*, p. 435
 - gg. Leaves coarse and fleshy spatulate, whole plant turning red. *Amaranthus pumilus*, p. 433
 - ff. Plants more than 3 dm. high.
 - g. Delicate, leaves petioled, the largest 25 mm. long or more.
 - h. Flowers in axillary clusters.
 - Parietaria*, p. 416
 - hh. Flowers in open, slender, axillary or terminal panicles. *Chenopodium boscianum*, p. 429
 - gg. Fleshy, leaves linear, less than 25 mm. long.
 - Chenopodiaceæ* (*Dondia*, *Bassia*), p. 432
 - ggg. Wiry, leaves less than 25 mm. long, linear or ovate sessile, flowers minute globular or pyriform in an open panicle. Plant later produces short prostrate root branches. *Lechea*, p. 562

- gggg. Coarse and often tall, leaves spatulate or lanceolate, flowers in dense spikes or small clusters, with dry, scarious, often redish bracts.
Amaranthaceæ, p. 433
- ee. Leaves crenate or dentate.
f. Slightly crenate, flowers in toothed axillary bracts.
Acalypha, p. 526
ff. Irregularly dentate; lanceolate or hastate.
Chenopodiaceæ, p. 432
fff. Sharply and evenly dentate, flowers in axillary or terminal flat panicles or cylindrical spikes.
Urticaceæ, p. 414
- dd. Plants prostrate.
e. Leaves verticillate.
Mollugo, p. 434
ee. Leaves opposite, fleshy seashore plants.
f. Leaves broad at base, $8-15 \times 4-7$ mm., strictly opposite.
Ammodenia, p. 441
ff. Leaves spatulate, $5-15 \times 3-5$ mm., somewhat whorled.
Sesuvium, p. 435
eee. Leaves lanceolate or linear.
f. Seeds three-angled, joints with scarious sheaths.
Polygonum, p. 419
ff. Seeds not three-angled, joints without sheaths.
[*Scleranthus*]* or *Sagina*, p. 439
- bbb. Calyx apparently absent.
c. Flowers at base of stem, single or several, maroon or brown.
Aristolochiaceæ, p. 418
cc. Flowers at summit of pedicels or stems, white, blue or yellow.
Ranunculaceæ, p. 448
- bbbb. Sepals and petals present, the latter conspicuous.
c. Petals united at their bases, often forming a tube or cup. p. 604
cc. Petals separate from one another.
d. Stamens numerous, more than ten and more than twice the number of sepals or calyx lobes.
e. Plants consisting of oval, flattened, fleshy joints, with prickles or bunches of minute spines, flowers large, yellow.
Opuntia, p. 573
ee. Plants with cup-like leaves.
Sarracenia, p. 467
ecc. Plants of normal structure, with leaves linear or flat.
f. Leaves peltate.
Podophyllum, p. 459
ff. Leaves not peltate.
g. Stamens united in an erect spike or column.
Malvaceæ, p. 549
gg. Stamens not forming an erect column.
h. Leaves opposite.
Hypericaceæ, p. 553
hh. Leaves not opposite.
i. Sepals 2.

* Knewel, a weed in waste ground.

- j. Plant prostrate, fleshy, flowers yellow.
[*Portulaca oleracea*]†
- jj. Plant erect, juice milky or orange, petals 4 or 8-12. *Papaveraceæ*, p. 460
- ii. Sepals 4, leaves 3-foliate fruit a pod. *Polanisia*, p. 466
- iii. Sepals 5 (or occasionally 3).
 - j. Flowers pendant, red and yellow with petals produced into long spurs. *Aquilegia*, p. 452
 - jj. Flowers normal, no long spurs.
 - k. Flowers yellow.
 - l. Fruit a dehiscent capsule. *Helianthemum*, p. 559
 - ll. Fruit a naked cluster of flattened achenes, each with a short style on its tip. *Ranunculus*, p. 450
 - lll. Fruit a cluster of seeds, often bristly, with persistent styles, calyx persistent at top or base. *Rosaceæ*, p. 475
 - kk. Flowers white or pink.
Fruit a fleshy berry, formed of a number of separate segments or else a cluster of dry seeds. *Rosaceæ*, p. 475
- dd. Stamens 10 or less, never twice as many as the petals.
 - e. Plants covered with reddish glutinous hairs. *Drosera*, p. 468
 - ee. Plants not covered with glutinous hairs.
 - f. Flowers very irregular.
 - g. Sepals petal-like, enlarged into a swollen spurred sac. *Impatiens*, p. 545
 - gg. Petals 5, two upper ones larger and somewhat reflexed, lower one spurred or gibbose at base. *Viola*, p. 564
 - ggg. Petals 5, single upper petal largest and reflexed, two lower ones united in a keel, enclosing the stamens and pistil. *Papilionaceæ*, p. 494
 - gggg. Petals 3, lower one keeled, others lateral, flaring. *Polygala*, p. 520
 - ggggg. Petals 4, forming a sort of sac, enlarged at base and narrowed to a slightly flaring tip, pendant. *Fumariaceæ*, p. 461
 - gggggg. Corolla 5-parted, a crown of 5 hooded bodies, filaments united into a tube which encloses the pistil, juice milky. *Asclepiadaceæ*, p. 646
 - ff. Flowers regular, i. e., petals all alike, or essentially so.
 - g. Flowers small in umbels, heads or panicles. *Araliaceæ*, p. 589
 - hh. Fruits dry, usually flattened, splitting into two. *Umbelliferæ*, p. 590

† Purslane, a common garden weed.

gg. Flowers not in umbels.

h. Petals four.

i. Leaves 3-foliate.

Polanisia, p. 466

ii. Leaves not pinnate.

j. Leaves opposite

k. Flowers pink, large.

Rhexia, p. 576

kk. Flowers pinkish, small.

Epilobium, p. 582

jj. Leaves alternate.

k. Flowers white or pink.

Cruciferae or *Chamaenerion*, pp. 462 or 582

kk. Flowers yellow.

l. Stamens 6.

Cruciferae, p. 462

ll. Stamens 4-8.

Onagraceae, p. 578

hh. Petals 2.

Circaea, p. 585

hhh. Petals 5.

i. Leaves radical.

j. Flowers pale lavender, leaves entire, salt marsh plant.

Limonium, p. 633

jj. Flowers white or greenish, leaves dentate, inland plants.

Saxifragaceae, p. 470

jjj. Flowers purple, leaves palmately 3-foliate.

Oxalis, p. 516

ii. Leaves cauline, opposite (or whorled).

j. Leaves, only one pair.

k. Plant fleshy, flowers white, striped with pink, pendant, leaves lanceolate entire.

Claytonia, p. 435

kk. Plant not fleshy, flowers small, white, leaves acute, heart shaped, toothed.

Mitella, p. 472

jj. Leaves more than one pair.

k. Flowers yellow.

Hypericaceae, p. 551

kk. Flowers white or pink.

Caryophyllaceae, p. 435

iii. Leaves cauline, alternate (lower opposite in some species).

j. Leaves 3-foliate.

k. Pinnately; leaflets serrate, lanceolate, acute, flowers white.

Porteranthus, p. 478

kk. Palmately; leaflets triangular, flowers yellow.

Oxalis, p. 516

jj. Leaves pedately 3-5 parted (rarely pinnate), segments lobed, flowers purple or whitish.

Geraniaceae, p. 514

jjj. Leaves simple.

k. Flowers blue.

Linum, p. 517

kk. Flowers yellow.

l. Plant fleshy, prostrate.

Portulaca, p. 435

ll. Plant erect, low and shrubby.

m. Leaves short, awl-like or close appressed and scale-like.

Hudsonia, p. 560

mm. Leaves scattered, linear or lanceolate, plant slender, flowers in an open panicle. *Linum*, p. 517

kkk. Flowers white or pinkish, in a naked spike, leaves close together in a sort of whorl at the base, thick and more or less evergreen. *Pyrolaceæ*, p. 608

Series I. CHORIPETALÆ.

Order PIPERALES.

Family SAURURACEÆ. Lizard Tails.

SAURURUS L.

Saururus cernuus L. Lizard's Tail.

Saururus cernuus Linnaeus, Sp. Pl. 341. 1753 [Maryland and Virginia].—Knieskern 27.—Britton 212.—Keller and Brown 114.

In swamps, often growing in water; frequent in the Northern, Middle and Cape May districts and occasional on the coast strip. Absent from the Pine Barrens.

Fl.—Late June to early August. *Fr.*—Late summer into autumn.

Middle District.—Medford (S), Kaighns Swamp (P), Red Bank (P), Washington Park, Mickleton.

Coast Strip.—Palermo (S).

Cape May.—Goshen (S), Court House, Nummeytown, Cold Spring.

Order SALICALES.

Family SALICACEÆ. Willows and Poplars.

Key to the Species.

a. Bracts fimbriate or incised leaves as broad as long.

b. Petioles terete, not strongly flattened.

c. Leaves dark green above, white wooly beneath, coarse toothed.

[*Populus alba*]*

cc. Leaves glabrous when mature, ovate, denticulate. ~

P. heterophylla, p. 391

* The White or Silver Poplar is a frequent introduction about old houses, often increasing enormously by suckers and forming dense thickets where neglected. Some old deserted houses in the Pine Barrens have been completely enveloped by these trees, the suckers even forcing their way through the rotten floors.

- bb. Petioles strongly flattened.
 - c. Leaves coarsely dentate. *P. grandidentata*, p. 392
 - cc. Leaves finely crenulate-denticulate. *P. tremuloides*, p. 392
- aa. Bracts entire, leaves longer than broad.
 - b. Leaves pubescent beneath.
 - c. Dull grayish, tomentous beneath.
 - d. Linear-ob lanceolate, 1-5 cm. long, crowded. *Salix tristis*, p. 394
 - dd. Oblanceolate or lanceolate, 5-15 cm. long, not crowded.
 - e. Petioles very short, young twigs less densely pubescent, leaves averaging more regularly lanceolate. A frequent species. *S. humilis*, p. 394
 - cc. Petioles longer, young twigs less densely pubescent, leaves more frequently oblanceolate, a rare species in our range, entering from the north. *S. bebbiana*, p. 394
 - cc. Lustrous and silky beneath. *S. sericea*, p. 395
 - e. Trees with inconspicuous greenish flowers in catkins or panicles.
 - bb. Leaves glabrous beneath or glabrate.
 - c. Regularly, finely and closely serrate.
 - d. With petiolar glands; long acuminate. *S. lucida*, p. 395
 - dd. Without glands.
 - c. Stipules persistent.
 - f. Leaves narrowly lanceolate; long attenuate. *S. nigra*, p. 392
 - ff. Leaves oblong lanceolate; acuminate. *S. cordata*, p. 393
 - ee. Stipules deciduous.
 - f. Leaves pale and glaucous beneath, usually very sparsely silvery silky. [*S. fragilis*]*
 - ff. Leaves green beneath, perfectly glabrous, except very rarely along the midrib. *S. nigra*, p. 392
 - cc. Irregularly or remotely serrate or toothed.
 - d. Green beneath, remotely denticulate; slender lanceolate. *S. interior*, p. 393
 - dd. Glaucous beneath, irregularly crenate-serrate; ovate or broadly lanceolate. *S. discolor*, p. 394

POPULUS L.

Populus heterophylla L. Swamp Poplar.

Populus heterophylla Linnæus, Sp. Pl. 1034. 1753 [Virginia].—Britton 227.
—Keller and Brown 115.

Wet woods of the Middle district; very rare. Known from one tree, found by Mr. Albert Commons, July 27, 1880, on Fortesque Beach, and a small grove discovered by Mr. Bayard

* Brittle Willow; a common tree along streams in cultivated districts. some other species of Willows are introduced about houses and occasionally escape or persist where farms have been deserted. Notable among these is the Weeping Willow (*S. babylonica*).

Long on the edge of the salt marsh near Cape May Court House, August 13, 1911.

Middle District.—Low woods on Delaware Bay, June 27, 1880, Commons (NB), evidently the basis of the Fortesque Beach record in Britton's catalogue.

Coast Strip.—Cape May Ct. House.

***Populus grandidentata* Michx. Large-toothed Aspen.**

Populus grandidentata Michaux, Fl. Bor. Am. II. 243. 1803 [Canada].—Britton 227.—Keller and Brown 115.

Woodland; common in the norther counties; casual southward in all districts. Probably introduced in the Pine Barrens.

Fl.—Early April to mid-April, appearing before the leaves.

Fr.—Early May to mid-May.

Middle District.—Farmingdale (S), Shark River, Holmdel (C), Phalanx (NB), Birmingham, Bordentown, Moorestown (C), Griffith's Swamp (NB), Woodbury, Glassboro, Mickleton (KB), Swedesboro (KB), Yorktown.

Pine Barrens.—Bamber, Albion, Andrews, Atco (C), Winslow Jnc., Batsto.

Coast Strip.—Barnegat City (L).

Cape May.—Whitesboro (S).

***Populus tremuloides* Michx. American Aspen.**

Populus tremuloides Michaux, Fl. Bor. Am. II. 243. 1803 [Canada and New York].—Knieskern 29.—Britton 227.—Keller and Brown 115.

Woodland; common in the northern counties; rare within our limits and apparently confined to the Middle and Coast districts.

Fl.—Late March to early April, before the leaves. *Fr.*—

Late April to early May.

Middle District.—Navesink Highlands (UP), Farmingdale, Browns Mills, Mt. Holly, Griffiths (P), Andrews.

Coast Strip.—Sandy Hook, Barnegat City (L).

SALIX L.

Flowering and Fruiting Data.—The flowers appear in spring before, or while, the leaves expand. The fruit matures rapidly, generally before the leaves are fully expanded. The leaves scarcely reach maturity before summer.

***Salix nigra* Marsh. Black Willow.**

Salix nigra Marshall, Arb. Am. 139. 1785 [Eastern U. S.].—Knieskern 29.—Britton 226.—Keller and Brown 116.

Common in the Middle district and also at one station in Passaic County and occasional in the coast strip.

Introduced in the Pine Barrens where ponds have been dug out.

Much or most of the New Jersey material examined proves to be the form *S. n. falcata*.

Fl.—Early May to late May, when leaves are partly expanded.

Fr.—Late May to mid-June.

Middle District.—Farmingdale, New Egypt, Birmingham, Burlington, Kirkwood, Andrews, Yorktown, Westville (UP), Mickleton (UP).

Pine Barrens.—Pleasant Mills, Winslow Jnc.

Coast Strip.—Sandy Hook, Surf City (L), Barnegat City (L), Tuckerton.

***Salix cordata* Muhl. Heart-leaved Willow.**

Salix cordata Muhlenberg, Neue Schrift. Ges. Nat. Fr. Berlin IV. 236, pl. 6, f. 3. 1803 [Lancaster, Penna.].—Britton 226.—Keller and Brown 117.

Frequent northward and south into our region, mainly along the Delaware River.

Fl.—Mid-April to early May, appearing before or with the leaves.

Fr.—Mid-May to early June.

Middle District.—Bordentown, Kinkora, Delanco, Fish House, Washington Park.

***Salix interior* Rowlee. Sand-bar Willow.**

Salix interior Rowlee, Bull. Torr. Bot. Club, XXVII.: 1900. 253. n. n. for

S. rubra Rich, nec Huds. 1762 [Boreal, N. A.].

Salix longifolia Britton 227.

Gravelly shores of the Delaware from Sussex to Gloucester counties; local.

Fl.—Early May, appearing with the leaves, and sporadically into July or even August. *Fr.*—Early June, sporadically through the summer.

Middle District.—Fish House, Kaighns Pt., Gloucester Co. (C).

* A willow was collected by Charles E. Smith April 29, 1866, at Griffith's Swamp and identified as *S. cordata*, and by Isaac C. Martindale and C. F. Parker six days later half a mile below Kaighns Pt., and identified as *S. petiolaris*. These form the basis for the record of *Salix petiolaris* Sm. within our limits, but Mr. Bayard Long, who has studied our local willows with great care, is of the opinion that these are not *petiolaris*, but more likely represent a hybrid between *S. cordata* and *S. sericea*.

Salix discolor Muhl. **Glaucous Willow.**

Salix discolor Muhlenberg, Neue Schrift Ges. Nat. Fr. Berlin IV. 234, pl. 6, f. 1. 1803 [Lancaster, Penna.].—Britton 225.—Keller and Brown 117.

Common in the northern counties and less common southward in the Middle district.

Specimens from our range are somewhat variable and show tendencies toward the forms known as *eriocephala* Michx., *prinoides* Pursh and *squamata* Rydberg, according to Mr. Long.

Fl.—Early April to mid-April, before the leaves. *Fr.*—Early May to mid-May.

Middle District.—Sandy Hook, Farmingdale, New Egypt, Mt. Holly, Andrews.

Salix bebbiana Sarg. **Bebb's Willow.**

Salix Bebbiana Sargent, Garden and Forest VIII. 463. 1895 [N. N. for *Salix rostrata* Rich nec Thuellier 1799]. [Boreal, N. A.].

Rare; only recorded from one locality within our range.

Fr.—Mature May 28-30, 1910, at Farmingdale.

Middle District.—Farmingdale.

Salix humilis Marsh. **Prairie Willow.**

Salix humilis Marshall, Arb. Am. 140. 1785 [U. S.].—Willis 57.—Britton 25.—Keller and Brown 117.

Frequent throughout the State in dry sandy ground.

Fl.—Early April to mid-April, before the leaves. *Fr.*—Early May to mid-May.

Middle District.—Farmingdale, Burlington, Clarksboro (UP), Gloucester (UP), Westville (UP), Swedesboro, Andrews, Yorktown.

Pine Barrens.—Winslow Jnc., Weekstown, Egg Harbor City (UP).

Cape May.—Cold Spring.

Salix tristis Ait. **Sage Willow.**

Salix tristis Aiton, Hort. Ken. III. 393. 1789 [Pennsylvania].—Pursh Fl. Am. Sept. II. 609. 1814. Britton 225.—Keller and Brown 117.

Ait one station each in Bergen, Hunterdon and Middlesex counties and frequent throughout our region.

Fl.—Early April to mid-April, before the leaves. *Fr.*—Early May to mid-May.

Middle District.—Farmingdale, Burlington, Merchantville (P), Garden Lake, 4 mi. bel. Westville, Swedesboro, Yorktown, Andrews, Bridgeton (NY), Salem Creek (C).

Pine Barrens.—Allaire, Landisville, Winslow Jnc., Egg Harbor City (UP).

Cape May.—Cold Spring.

***Salix sericea* Marsh. Silky Willow.**

Salix sericea Marshall, Arb. Am. 140. 1785 [Eastern U. S.].—Willis 57.—Britton 225.—Keller and Brown 118.

Frequent in the Northern and upper Middle districts.

Fl.—Early April to late April, before or with the leaves. *Fr.*—Mid-May to early June.

Middle District.—Farmingdale, Delanco, Kaighns Pt. (UP).

***Salix lucida* Muhl. Shining Willow.**

Salix lucida Muhlenberg, Neue Schr. Ges. Nat. Fr. Berlin 1803 IV., p. 239 [Lancaster, Penna.].

Very rare within our range; reported from five stations in the northern counties and from Sandy Hook, where it was collected October, 1897, by Mr. Alexander MacElwee.

Coast Strip.—Sandy Hook.

Order MYRICALES.

Family MYRICACEÆ. Bayberries.

Key to the Species.

a. Leaves serrate or entire, no stipules.

b. A large shrub or small tree, 30–45 dm. high, leaves lanceolate, acute, often rusty with resinous dots, berries 2 mm. in diameter.

M. cerifera, p. 396

bb. A shrub 6–24 dm. high, leaves broader, oblong, resinous dotted but green, berries 3–4 mm. in diameter.

M. carolinensis, p. 395

aa. Leaves pinnatifid, stipulate.

Comptonia, p. 396

MYRICA L.

***Myrica carolinensis* Mill. Bayberry.**

Myrica carolinensis Miller, Gard. Dict. Ed. 8, No. 3. 1768 [Lower Carolina].

Myrica cerifera Knieskern 28.—Britton 220.—Keller and Brown 118.

Low grounds, borders of swamps, etc. Casual in the Northern and Middle districts; frequent in the Pine Barrens and Cape May peninsula and abundant on the coast.

Fl.—Early May to early June, before or with the leaves. *Fr.*—Late July into August, persisting over winter.

Middle District.—Farmingdale (S), Brindletown, Riverton, Browns Mills, Tomlinson's, Woodbury, E. of Sewell (S), Alloway, W. of Bridgeton (S), Dividing Creek.

Pine Barrens.—Bamber, Speedwell (S), Bear Swamp (S), Waterford, Cedar Brook, Landisville, Pleasant Mills (T), Tuckahoe.

Coast Strip.—Pt. Pleasant (S), Toms River, Seaside Park (S), Surf City (L), N. Beach Haven (L), Absecon, Atlantic City, Ocean City (S), Anglesea.

Cape May.—Seaville (S), Bennett (S), Cape May (S), 2 mi. E. Dias Creek (S), Sluice Creek (S).

***Myrica cerifera* L. Wax Myrtle.**

Myrica cerifera Linnaeus, Sp. Pl. 1024. 1753 [Carolina, Virginia and Penna].
—Sargent Manual N. A. Trees. 147. 1905.—Long, *Bartonia* II. 21. 1910.

Low ground; mainly restricted to the western part of the lower Cape May peninsula, where it is common, though not to the exclusion of the other species which occurs with it. This species was first recorded from New Jersey by Prof. C. S. Sargent, on the basis of a specimen collected by Isaac C. Martindale in Cape May County.

Fl.—Early May to early June, before or with the leaves. *Fr.*—Early August into September, persisting over winter.

Coast Strip.—Palermo.

Cape May.—W. of Cape May Ct. House, Dias Creek, Green Creek (S).

COMPTONIA Banks.

***Comptonia asplenifolia* (L.). Sweet Fern.**

Pl. LIV., Fig. 2.

Myrica asplenifolia Linnaeus, Sp. Pl. 1024. 1753 [N. America].—Britton 220.
Comptonia asplenifolia Barton Fl. Phila. II. 159. 1818.—Knieskern 28.

Dry ground, common throughout the State, especially plentiful in the Pine Barrens, where, in association with the Bracken, it often forms a large part of the shrubby underbrush.

Fl.—Late April to early May, before or with the leaves. *Fr.*—mid-June into July.

Middle District.—Farmingdale, Birmingham, Riverside, Sicklerville, Yorktown.

Pine Barrens.—Allaire (S), Waretown, Speedwell (S), Plains (S), Bear Swamp (S), Albion, Landisville, Mays Landing (S).

Coast Strip.—Beach Haven (L), Ocean City (S).

Cape May.—Court House (S).

Order JUGLANDALES.

Family JUGLANDACEÆ. Walnuts and Hickories.

Key to the Species.

- a. Husk not splitting.
 - b. Fruit globular, petioles puberulent. *Juglans nigra*, p. 397
 - bb. Fruit oblong, pointed, petioles pubescent with viscid hairs. *J. cinerea*, p. 397
- aa. Husk splitting when fruit is ripe.
 - b. Husk of fruit thick, splitting freely to the base, foliage and twigs pubescent.
 - c. Leaflets 3-5, bark shaggy, splitting off in long plates. *Hicoria ovata*, p. 398
 - cc. Leaflets 7-9, bark close. *H. alba*, p. 398
 - bb. Husk of fruit thin, splitting only at the top, foliage glabrous at maturity.
 - c. Leaflets narrow, lanceolate 7-9, bark close, nut sub-globose. *H. cordiformis*, p. 399
 - cc. Leaflets oblong or ovate lanceolate 5-7, bark splitting in shaggy plates, nut nearly globose. *H. microcarpa*, p. 399
 - ccc. Leaflets obovate, or oblong 3-7, bark close, nut obovoid or oblong. *H. glabra*, p. 398

JUGLANS L.***Juglans nigra* L. Black Walnut.**

Juglans nigra Linnæus Sp. Pl. 997. 1753 [Virginia and Maryland].—Knieskern 28.—Britton 219.

Rich woodlands; frequent in the northern counties and occasional in the Middle district within our limits. Many trees have undoubtedly been introduced, and probably all those in Cape May County come under this head.

Fl.—Early May to late May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

Middle District.—Farmingdale, Oaklyn (S), Sewell (S), S. of Millville.*

HICORIA Rafinesque.

Fruiting and Flowering Data.—Flowers appear after the leaves have unfolded. Fruit ripens the first season.

* *Juglans cinerea* Linnæus, Sp. Pl. Ed. II. 1415. 1763 [North America] is frequent in woods in the northern counties, but within our limits known only from the statements of Knieskern and Willis, who record it respectively from Ocean and Monmouth and Burlington Counties, where it seems hardly likely to have been native.

Hicoria ovata (Mill.). Shag-bark, Shell-bark Hickory.

Juglans ovata Miller, Gard. Dict. Ed. 8, No. 6. 1768 [Virginia].—*Carya laciniosa* Barton Fl. Phila. II. 178 ?

Hicoria ovata Britton 219.

Common in woods of the northern counties, occasional in the Middle district.

Fl.—Mid-May to early June, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

Middle District.—Mickleton, Swedesboro.

Hicoria alba (L.). Mocker Nut.

Juglans alba Linnæus, Sp. Pl. 997. 1753 [Virginia].

Carya tomentosa Knieskern 28.

Hicoria alba Britton 219.

Woodland; common in the northern counties, less frequent in the Middle and Cape May districts, rare on the coast and absent from the Pine Barrens.

Hickories are rare and questionably native in the Pine Barrens, but frequent in West Jersey, growing singly in fields or bordering the edge of Woodland. Frequently this and the two following grow in close proximity, as at Medford.

Fl.—Early May to late May, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

Middle District.—Belmar (NY), Allaire, New Egypt, Medford (S), Lawnside (S), Mickleton.

Pine Barrens.—Folsom (introduced?).

Coast Strip.—Beesley's Pt. (S).

Cape May.—Sluice Creek (S), Dias Creek (S).

Hicoria glabra (Mill.). Pig-nut Hickory.

Juglans glabra Miller, Gard. Dict. Ed. 8, No. 5. 1768 [Virginia].

Carya amara Knieskern 28.

Hicoria glabra Britton 219.

Common in woods of the Northern and Middle districts, much less common elsewhere.

Fl.—Early May to late May, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

Middle District.—New Egypt, Bordentown, Medford (S), Camden (C), W. Deptford, Oaklyn (S), Union Grove (S), Mickleton, Bridgeton (NB).

Pine Barrens.—Manahawkin, Albion, Winslow Jnc. (S).

Cape May.—Dias Creek (S).

Hicoria cordiformis (Wang.). **Bitter-nut Hickory.**

Juglans cordiformis Wangenheim, N. A. Holz, p. 25. 1787 [New York and New England].

Hicoria minima Britton 219.

Woodland of the Northern and Middle districts, occasional.

Fl.—Mid-May to early June, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

Middle District.—Pemberton Jnc. (C), Medford (S).

Hicoria microcarpa (Nutt.). **Small-fruited Hickory.**

Carya microcarpa Nuttall, Gen. II. 221. 1818 [Banks of the Schuylkill, near Philadelphia].

Hicoria microcarpa Britton 219.

Reported in Britton's Catalogue from Sea Breeze, Cumberland Co., on authority of Mr. Albert Commons.

Fl.—Mid-May to early June, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

Order FAGALES.**Family BETULACEÆ. Birches, Hazels, etc.**

a. Fruit small, narrowly margined or winged between the bracts of a cone-like ament.

b. Bracts of ament deciduous with the winged seeds.

c. Bark chalky white, peeling somewhat, leaves deltoid, acuminate.

Betula populifolia, p. 400

cc. Bark reddish or greenish brown, peeling off in thin, ragged sections, leaves rhombic, cuneate at base, light colored beneath.

B. nigra, p. 401

ccc. Bark brown, not peeling off in layers, leaves ovate, cordate or rounded at base.

B. lenta, p. 401

bb. Bracts woody and persistent.

Alnus, p. 402

aa. Fruit small in small aments, each seed subtended by a flat, green bractlet, much cut and lobed.

Carpinus, p. 399

aaa. Fruit small, enclosed in an inflated, green bag-like bractlet.

Ostrya, p. 400

aaaa. Fruit a large, woody-shelled nut inclosed by a leafy involucre.

Corylus, p. 400

CARPINUS L.**Carpinus caroliniana** Walt. **Hornbeam, Water Beech.**

Carpinus caroliniana Walter, Fl. Cor. 236. 1788 [South Carolina].—Britton 221.

Carpinus americana Knieskern 28.

Common in woods of the northern counties, less common southward in the Middle district and rare on the Cape May peninsula.

Fl.—Mid-April to late April, as the leaves begin to expand.
Fr.—Well grown by mid-summer, not usually mature until early autumn.

Middle District.—Farmingdale, New Egypt, Bordentown, Kinkora, Birmingham (S), Medford (S), Woodbury, Yorktown.

Cape May.—Goshen.

OSTRYA Scopoli.

Ostrya virginiana (Mill.). Hop-Hornbeam, Iron-wood.

Carpinus virginiana Miller, Gord. Dict. Ed. 8. No. 4. 1768 [Virginia].

Frequent in the northern counties, very rare within our limits. A single station on steep banks of the Delaware at Kinkora, facing the north (B. Long).

Fl.—Mid-April to late April, as the leaves begin to spread.
Fr.—Well grown by mid-summer, mature in early autumn.

Middle District.—Kinkora.

CORYLUS L.

Corylus americana Walt. Hazel-nut.

Corylus americana Walter, Fl. Cor. 236. 1788 [South Carolina].—Knieskern 28.—Britton 222.

Thickets of the Northern and Middle districts; frequent.

Fl.—Early March to early April, before the leaves. *Fr.*—Well grown by mid-summer, but not commonly mature before early autumn.

Middle District.—Farmingdale, New Egypt, Bordentown, Birmingham, Pemberton Inc. (S), Medford (S), Haddonfield, Mickleton, Swedesboro, Yorktown, Quinton.

BETULA L.

Betula populifolia Marsh. White Birch.

Betula populifolia Marshall, Arb. Am. 19. 1785 [New Jersey].—Britton 220.
Betula alba var. *populifolia* Knieskern 29.

Generally in moist ground, common northward and in the Pine Barrens, less abundant and more local in the Middle district.

This is a characteristic species of the coastal swamps and eastern Pine Barrens. Its white trunks are always conspicuous against the evergreens, particularly in winter.

Fl.—Mid-April to early May, when the leaves are partly expanded. *Fr.*—Late summer to early autumn.

Middle District.—Farmingdale, Pt. Pleasant (S), New Egypt, Kinkora, Hartford, Medford (S), Sicklerville (S).

Pine Barrens.—Belmar (NY), Manahawkin, West Creek (S), Lakehurst, Bear Swamp, Batsto, Pleasant Mills, Mays Landing (S), Egg Harbor City (UP).

Coast Strip.—Ship Bottom (L).

***Betula lenta* L. Cherry Birch, Sweet Birch.**

Betula lenta Linnaeus, Sp. Pl. 983. 1753 [Virginia and Canada].—Britton 220.

A tree of the woodlands of the northern part of the State occurring within our limits as a rare and local species of the Middle district.

Mr. Gifford Pinchot* records forty-two trees of this species in one acre of cedar swamp near Whitings, but there must have been a mistake in identification, as we have never found the tree anywhere in the Pine Barrens; perhaps the name is a misprint for White Birch.

Fl.—Late April to early May, when the leaves are partly expanded. *Fr.*—Late summer.

Middle District.—Navesink Highlands (UP), Bordentown, Kinkora, Glassboro, ravine east of Mullica Hill (H).

***Betula nigra* L. River Birch, Red Birch.**

Betula nigra Linnaeus, Sp. Pl. 982. 1753 [Virginia and Canada].—Pursh, Fl.

Am. Sept. II. 621. 1814.—Knieskern 29.—Britton 221.

Betula papyrifera Barton, Fl. Phila. II. 175. 1818.

River and lake shores; common in the Northern and Middle districts and rarely on the coastal streams below the head of tide-water, and on ponds at Cape May Point.

Fl.—Mid-April to early May, when leaves are partly expanded. *Fr.*—Late May to early June.

Middle District.—Farmingdale, Pt. Pleasant (S), Walnford (NB), Crosswicks, Delanco (S), Fish House, Gloucester (UP), Hartford, Pemberton Inc. (S), Medford (S).

* Forestry Report appended to Ann. Rept. State Geol. N. J. 1898, pp. 98-100.

Coast Strip.—Mays Landing (S).*

Cape May.—Cape May Pt., on Lily Lake (OHB).

ALNUS Gaertner.

Alnus rugosa (DuRoi). Alder.

Betula Alnus rugosa DuRoi, Harbk. Wild. Baumzt. I. 112. 1771 [North America].

Alnus serrulata Knieskern 29.—Britton 221.

Low grounds, forming swamp thickets; common in the Northern and Middle districts and in the cedar swamps of the Pine Barrens, rare on the Coast and apparently not common on the Cape May peninsula (?)

The swelling of the staminate catkins of the Alder is the first sign of awakening spring in the swamps of south Jersey, but they often attain their full length and flexibility some time before the pollen is actually liberated, and they may be said to be in bloom.

Fl.—Mid-March to early April, before the leaves expand; from catkins formed the previous summer. *Fr.*—September.

Middle District.—Farmingdale (S), Pt. Pleasant (S), Birmingham, Pemberton Inc., Bordentown, Kinkora, Masonville, Camden, Lawnside (S), Medford (S), Washington Park, Swedesboro.

Pine Barrens.—Toms River (NY), Manahawkin, Barnegat, Speedwell, Bear Swamp, Atco, Albion, Penbryn (S), Pancoast, Folsom, West Creek.

Coast Strip.—Surf City (L).

Family FAGACEÆ. Beeches, Chestnuts and Oaks.

a. Nuts two, sharply triangular, enclosed in a thin four-valved bur, tomentous outside and with soft prickles. Bark very smooth, light gray.

Fagus, p. 402

aa. Nuts plano-convex, in a large spiny bur.

b. Nuts 1-5, leaves glabrous; a large tree.

Castanea dentata, p. 403

bb. Nut 1, leaves tomentous below, a shrub.

C. pumila, p. 403

aaa. Nut, single, an acorn with scaly basal cup.

Quercus, p. 404

FAGUS L.

Fagus grandifolia Ehrhart. Beech.

Fagus grandifolia Ehrhart., Beitr. Nat. Wiss., vol. III., p. 22. 1788 [North America].

Fagus ferruginea Knieskern 28.—Willis 56.—Britton 225.

*This tree as well as *Pinus virginiana* and some other species occurs along the river below the dam at Mays Landing, along with species characteristic of the Coast Strip. These, however, have not been found on the coast and are completely cut off by the Pine Barrens from their relatives in the Middle district.

Common in woodlands of the Northern and upper Middle districts, rarer southward to Cape May County.

In certain parts of Camden County, near to the Delaware, there are considerable areas of almost pure Beech forest, practically devoid of underbrush.*

Fl.—Late April to early May, when leaves are fully expanded. Fruit matures by late July or early August, soon dropping.

Middle District.—Freehold (Willis), Squam and Shark River (Kn.), Pt. Pleasant (S), Birmingham, Arneys Mt. (S), New Egypt, Medford (S), Oaklyn (S), Woodbury, Mickleton, Fairton (S).

Coast Strip.—Manahawkin.

Cape May.—Sluice Creek (S), Cold Spring (OHB).

CASTANEA Adanson.

Castanea dentata (Marsh.). Chestnut.

Fagus-Castanea dentata Marshall, Arb. Am. 46. 1785 [Eastern U. S.].

Castanea vesca Knieskern 28.

Castanea sativa var. *americana* Britton 224.

Common in woods of the Northern and parts of the Middle districts, rare in Cape May County and in the Coast strip.

Fl.—Late June to mid-July, when the leaves are fully expanded. *Fr.*—Matures late September or during October.

Middle District.—Shark River (Kn.), Farmingdale, Squan (Kn.), New Egypt, Fish House (S), Paulsboro, Repaupo, Medford (S), Albion, Mickleton, Sicklerville (S), Bridgeton (C), Fairton (C), Yorktown.

Coast Strip.—Waretown, Manahawkin.

Cape May.—Sluice Creek (S).

Castanea pumila (L.). Chinquapin.

Fagus pumila Linnæus, Sp. Pl. 998. 1753 [North America].—Pursh, Fl. Am. Sept. II. 625. 1814.

Castanea pumila Britton 224.—Keller and Brown 121.

Locally in the Middle district from Mercer to Salem Counties.

Fl.—Early June to early July, when the leaves are fully expanded. *Fr.*—Matures during September.

Middle District.—Clarksboro, Tomlin, Mickleton, Swedesboro, Jericho (C), Pennsgrove (S).

* The Coastal Plain Beech should be *F. g. caroliniana* Loudon (cf. Rehder. Rhodora 1907, p. 114), but I fail to separate it from the northern form.

QUERCUS L.

Flowering and Fruiting Data.—Flowers in late spring when leaves are usually one-third to one-half expanded. Fruit ripe and dropping in early or mid-autumn of either the first or second season.

Key to the Species.

- a. Leaves or their lobes bristle-tipped.
 - b. Leaves oblong or linear oblong, entire (or with 1-2 irregular points or lobes).
 - c. Linear-oblong, never lobed. *Q. phellos*, p. 408
 - cc. Oblong occasionally with an irregular lobe or two.
 - Q. rudkini*, p. 411
 - bb. Leaves obovate, generally 3-5 lobed above the middle, rusty tomentose or pubescent beneath. *Q. marilandica*, p. 407
 - bbb. Leaves pinnately lobed.
 - c. Green beneath.
 - d. Cup or acorn shallow, saucer-like.
 - e. Cup 16-25 mm. broad, acorn ovoid. *Q. rubra*, p. 405
 - ee. Cup 8-16 mm. broad, acorn subglobose. *Q. palustris*, p. 405
 - dd. Cup turbinate, or hemispheric.
 - e. Cup brown, the scales finally glabrate and shiny. *Q. coccinea*, p. 405
 - ee. Cup ashy, with persistent dull pubescence. *Q. velutina*, p. 405
 - cc. Grayish-white beneath.
 - d. Large tree, leaf lobes, lanceolate, sometimes falcate. *Q. triloba*, p. 406
 - dd. Small tree or usually shrub, leaf lobes triangular. *Q. ilicifolia*, p. 407
- aa. Leaves or their lobes not bristle-tipped, more or less rounded.
 - b. Leaves pinnately lobed.
 - c. Pale or glaucous and glabrous beneath. *Q. alba*, p. 408
 - cc. Brown tomentose beneath, lyrate-pinnatifid. *Q. stellata*, p. 409
 - ccc. White tomentous beneath, lyrate-pinnatifid. *Q. lyrata*, p. 409
 - bb. Leaves crenate or dentate, not lobed.
 - c. Low shrub, leaves ovate or obovate, 6-13 × 5-8 cm. *Q. prinoides*, p. 410
 - cc. Tall tree, leaves much larger.
 - d. Leaves white tomentulose beneath, peduncle of acorn much larger than the petioles. *Q. bicolor*, p. 409
 - dd. Leaves gray, tomentulose beneath, peduncles equalling or shorter than the petioles.
 - e. Bark, white flaky, leaves broadly obovate, teeth sharper. *Q. michauxii*, p. 410
 - ee. Bark close, leaves narrower, teeth rounder. *Q. prinus*, p. 410

Quercus rubra L. Red Oak.

Quercus rubra Linnæus, Sp. Pl. 996. 1753 [Virginia and Carolina].—Knieskern 28.—Britton 224.

Common in rocky woods of the northern part of the State, rare and local in the Middle district and lower Cape May peninsula. Reported from Landisville in Britton's Catalogue on authority of C. A. Gross, but there are no specimens in his herbarium.

Fl.—Late April to early May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

Middle District.—Farmingdale (NB), Birmingham, Atco (C), Camden (C), Mickleton, Springdale (S), Swedesboro (S).

Cape May.—Cold Spring.

Quercus palustris DuRoi. Pin Oak.

Quercus palustris DuRoi, Harbk. II. 268. Pl. 5, f. 4. 1772 [North America].—Britton 224.

Common in low woods in the northern part of the State, and frequent in similar situations in the Middle and Cape May districts.

Fl.—Late April to early May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

Middle District.—New Egypt, Medford, Swedesboro.

Cape May.—Court House (S), Green Creek (S).

Quercus coccinea Muench. Scarlet Oak.

Quercus coccinea Muenchausen, Hansv. V. 254. 1770 [].—Willis 56.—Britton 224.

Rather common throughout, but least plentiful in the Pine Barrens.

Fl.—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the second season.

Middle District.—Navesink Highlands (UP), Shark River (UP), Keyport (NB), New Egypt, Moorestown, Medford (S), Fish House (S), Oaklyn (S), Springdale (S), Swedesboro.

Pine Barrens.—Atsion (S), Atco, Whittings (NY), Applepie Hill (S), Mays Landing (S), Tuckahoe (S).

Coast Strip.—Forked River, Manahawkin, Cox's, Atlantic City (S).

Cape May.—Bennett (S).

Quercus velutina Lam. Black Oak.

Quercus velutina Lamarck, Encycl. I. 721. 1783 [Virginia].

Quercus tinctoria Knieskern 28.—Britton 224.

Distribution apparently as in the last. The two have not been carefully distinguished by our botanists.

Fl.—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the second season.

Middle District.—New Egypt, Arneys' Mt., Medford (S), Farmingdale (NY), Mantua, Springdale (S).

Pine Barrens.—Ancora (UP).

Coast Strip.—Pasadena, Mays Landing (S), Anglesea Inc. (S), Pleasantville (NY).

***Quercus triloba* Michx. Spanish Oak.**

Quercus triloba Michaux, Hist. Chenes Amer. No. 14, t. 26. 1801 [New England to Georgia].

Quercus falcata Pursh, Fl. Am. Sept. II. 631. 1814.—Barton, Fl. Phila. II 170. 1818.—Knieskern 28.—Willis 56.

Quercus digitata Keller and Brown 123.

Quercus cuneata Britton 224.

Common in low woods of the Middle district and in meadows from Monmouth County southward, also on the Coast strip and Cape May peninsula.

This tree is a constant associate of the Sweet Gum and Willow Oak, the three having an almost identical distribution in New Jersey and Pennsylvania, limited sharply on the west by the fall line.

The dark-glossy upper surface and lighter lower surface, together with the long falcate terminal segments of the leaves, give to the foliage a characteristic appearance.

The outline of individual leaves varies greatly even on the same tree, but I cannot by any character separate our Spanish Oaks into two forms, although Dr. Britton credits *Q. pagodaefolia* to our range. There is a form specially prevalent on the coast, with long triangular leaves, with three nearly equal, rather blunt, terminal lobes.

Fl.—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

Middle District.—Keyport (C), Farmingdale, Pt. Pleasant (S), Birmingham, Pemberton (C), Moorestown (C), Medford, Springdale (S), Orchard (S), Oaklyn (S), W. Deptford, Gloucester, Sicklerville (S), Tomlin, Woodstown (NB), Swedesboro, Bridgeton (NB), Sharpstown, Mickleton (UP), Moorestown (UP), Woodbury (UP).

Pine Barrens.—Allaire (S), Chairville (S), Landisville (T), Winslow Inc., Hammonton, Mays Landing (S).

Coast Strip.—Seaside Park (UP), Forked River, Surf City (L), Atlantic City (S), Beesley's Pt. (S), Five-Mile Beach.

Cape May.—Court House (S), Dias Creek (S), Cold Spring, Cape May.

***Quercus ilicifolia* Wang. Scrub Oak.**

Quercus ilicifolia Wangenheim, Nord. Am. Holz, 79, pl. 6, f. 17. 1787 [Hamstead, Long Island].—Knieskern 28.—Willis 56.—Britton 224.

Quercus Bannisteri Michaux Fl. Bor. Am. II. 199. 1803.—Pursh Fl. Am. Sept. II. 631. 1814.

Common in sandy soil throughout the State. One of the most abundant oaks of the Pine Barrens, forming with *Q. marilandica* most of the scrub growth of the Plains.

Fl.—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

Middle District.—Farmingdale (S), Shark River, Belmar (UP), Sicklerville (S).

Pine Barrens.—Waretown, Whitings, Speedwell (S), Bear Swamp (S), Applepie Hill (S), E. and W. Plains (S), Cedar Brook, Albion, Landisville (T), Egg Harbor City, Absecon (S), Dennisville (OHB), Hammonton (UP), Williamstown Inc. (UP).

Coast Strip.—Seaside Park (S).

***Quercus marilandica* Muench. Black-Jack Oak.**

Quercus marilandica Muenchausen, Hansv. V. 253. 1770 [].

Quercus nigra Pursh Fl. Am. Sept. II. 629. 1814.—Knieskern 28.—Britton 223.

Common in sandy ground from Middlesex and Mercer counties southward; most abundant in the Pine Barrens.

Fl.—Early May to mid-May, when leaves are partly expanded. *Fr.*—Autumn of the second season.

The Black-Jack is the typical oak tree of the most barren stretches of southern New Jersey and the most characteristic tree of the Pine Barrens after the Pitch Pine and White Cedar. Its broadly obovate leaves and the bright rusty coloration of their under surface makes it a conspicuous and easily recognized species. While it becomes a mere shrub on the "plains," its normal growth is higher than that of *Q. ilicifolia* and it is usually a tree of ten to twenty feet in height.

Middle District.—Keyport (NB), Farmingdale (S), New Egypt, Arneys Mt. (S), Orchard (S), Mantua, Lawnside (S), W. Deptford, Swedesboro, Yorktown, 2 mi. W. Bridgeton (S), Fairton (S).

Pine Barrens.—Toms River (NB), Waretown, E. and W. Plains (S), Speedwell (S), Applepie Hill (S), White Horse (S), Bear Swamp (S), Pleasant Mills.

Coast Strip.—Seaside Park (S), Barnegat City (L).

Cape May.—Cape May (S), Bennett.

Quercus phellos L. Willow Oak.

Quercus Phellos Linnæus, Sp. Pl. 994. 1753 [North America].—Michaux Fl. Bor. Am. II. 197. 1803.—Pursh Fl. Am. Sept. II. 625. 1814.—Barton Fl. Phila. II. 167. 1818.—Knieskern 28.—Willis 55.—Britton 223.

Quercus phellos var. *humilis* Pursh Fl. Am. Sept. II. 625. 1814.—Britton 223.

Low woods of the Middle, Coast and Cape May districts, from Mercer and Middlesex counties southward, common.

A typical tree of the coastal plain crossing the Delaware into Pennsylvania, but never passing west of the fall line, and pushing up the Delaware only a very short distance above Trenton.

There is a broader-leaved Willow Oak ranging from Salem to western Cape May County, which is perhaps referable to *Q. p. laurifolia*, although the leaves on some trees at least show a slight tendency to lobing, such as we find in certain hybrids (cf. p. 411).

Fl.—Early May to mid-May, when the leaves are expanding.

Fr.—Autumn of the second season.

Middle District.—Keyport (NB), Farmingdale, Allaire, Belmar (UP), Long Branch (C), Pt. Pleasant (S), New Egypt, Arney's Mt. (S), Birmingham, Medford, Bridgeport, Oaklyn (S), W. Deptford, Lawnside (S), Sicklerville (S), Glassboro, Yorktown, Salem (S), Beaver Dam (S), Dividing Creek, Millville.

Pine Barrens.—Landisville (T), introduced?

Coast Strip.—Seaside Park (S), Peermont (S), Anglesea, West Creek (S).

Cape May.—Bennett, Court House.

Quercus alba L. White Oak.*

Quercus alba Linnæus Sp. Pl. 996. 1753 [Virginia].—Knieskern 28.—Britton 222.

Common in woodlands throughout the State, except in the Pine Barrens, where it is local and largely in second growth.

A good deal of variation in leaf form occurs, some trees having exceedingly deep cut lobes, while in others they are very shallow.

*The record of *Q. macrocarpa* from Ventnor (Githens) in Keller and Brown's list is apparently based on *Q. stellata*; that from Quaker Bridge in Britton's Preliminary Catalogue was canceled in his later work.

Fl.—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

Middle District.—Farmingdale (S), New Egypt, Arneys Mt. (S), Pemberton Inc. (S), Medford, Springdale (S), Locust Grove (S), Red Bank, Reapaupo, Swedesboro, Sicklerville (S), Yorktown, Bridgeton (NB).

Pine Barrens.—Bear Swamp (S), Albion, Landisville (T), Mays Landing (S).

Coast Strip.—Manahawkin, Surf City (L), Absecon, Atlantic City (S), Pleasantville (NY).

Cape May.—Cape May.

***Quercus stellata* Wang. Post Oak.**

Quercus stellata Wangenheim, Nordam Holz. 78, p. 6, f. 15. 1787 [New York].

Quercus obtusiloba Knieskern 28.—Willis 55.

Quercus minor Britton 222.

Dry ground; rather frequent throughout our region and casual farther north.

The leaf lobes are sometimes forked again, making quite a complicated outline.

Fl.—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

Middle District.—Shark River (UP), Farmingdale, New Egypt, Arneys Mt. (S), Pemberton (NB), Medford, Orchard (S), W. Deptford, Glassboro, Swedesboro, Yorktown, Bridgeton (S), Fairton (S).

Pine Barrens.—Speedwell, White Horse, Bear Swamp (S), Landisville (T), Folsom, Pleasant Mills (S), Mouth of Batsto, Mays Landing (S).

Coast Strip.—Forked River, Manahawkin, Absecon, Atlantic City (S), Pleasantville (NY), Piermont, Five-Mile Beach.

Cape May.—Cape May (S).

***Quercus bicolor* Muhl. Swamp White Oak.**

Quercus bicolor Muhlenberg in Wildenow, Neue Schrift Gess. Nat. Fr. Berlin III. 396. 1801 [North America, prob. Penna.].—Britton 222.

Quercus platanoides Keller and Brown 124.

Swamps and meadows in the northern counties, southward in the Middle district, mainly along the Delaware river, local and not very common within our limits.

Fl.—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the first season.

Middle District.—Farmingdale, Moorestown, Medford, Marlton (C), Mickleton (H), Swedesboro, Riddleton (KB), Salem (S).

***Quercus lyrata* Walter. Swamp Post Oak.**

Quercus lyrata Walter, Fl. Car. 235. 1788 [S. Carolina], Keller and Brown 123.

Only known from the tree at Riddleton, discovered by Messrs. Heritage, Lippincott and Crawford. The records for Ventnor and Mickleton (KB) were errors. See also under Hybrid oaks.

Middle District.—Riddleton*.

***Quercus prinus* L. Rock Chestnut Oak.**

Quercus prinus Linnæus, Sp. Pl. 995. 1753 [North America].—Knieskern 28.—Willis 55.—Britton 222.

Common in the woods of the Northern and Middle districts, and somewhat less plentiful or local in the Pine Barrens and Cape May peninsula.

Fl.—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the first season.

Middle District.—Shark River (UP), Farmingdale (S), Arneys Mt. (S), Fish House, Springdale (S), Lawnside (S), Below Washington Park (S), Repaupo, Clarksboro, Mickleton (UP).

Pine Barrens.—Barnegat, Kenilworth, Bear Swamp (S), Tabernacle, Quaker Bridge (S), Landisville (T), Cedar Brook, Albion, Palermo (S).

Cape May.—Goshen (S), Court House (S), Cape May (S).†

***Quercus michauxii* Nutt. Basket Oak.**

Quercus Michauxii Nuttall, Gen. II. 215. 1818 [The Delaware to St. Mary's, W. Florida].—Keller and Brown 124.

Local in the lower part of the Middle district.

Middle District.—Moorestown, Repaupo (C), Upper Pennsgrove.

***Quercus prinoides* Willd. Scrub Chestnut Oak.**

Quercus prinoides Willdenow, Neue Schrift Ges. Nat. Fr. Berlin III. 397. 1801 [N. A.—probably Penn.].—Keller and Brown 124.—Knieskern 28.

Quercus chinquapin Barton, Fl. Phila. II. 173. 1818.

Quercus prinus var. *humilis* Willis 55.

Quercus Muhlenbergii var. *humilis* Britton 223.

Locally common in dry woods of the Middle and Pine Barren districts.

In some sections of the Pines this little oak makes up a large proportion of the underbrush, and the branches are weighted

* Harshberger (Phytogeographic Survey of N. A., p. 414) quotes *Q. lyrata* as a component of the forest at Peermont, but none of the other botanists who have visited the locality have found this tree. *Q. stellata* is the common species there.

† The records of *Q. acuminata* from Mullica Hill and Bridgeton are apparently referable to *Q. prinus*, which varies greatly in the shape of its leaves.

down with the abundance of acorns. It is frequently only two feet in height, and rarely more than four.

Fl.—Mid-May to late May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

Middle District.—Farmingdale, New Egypt (NY), Birmingham, Locust Grove (S), Gloucester, W. Deptford, Swedesboro, Bridgeton (NB), Clarksboro (UP), Mickleton (UP).

Pine Barrens.—Toms River (NB), Edge of E. Plains (S), Speedwell (S), Chatsworth, Applepie Hill (S), Tabernacle (S), Clementon (S), Landisville, Hammonton, Mays Landing (S), Absecon (S).

HYBRID OAKS.

Besides exhibiting a great range of variation oaks hybridize readily and perplexing forms are constantly presenting themselves.

One of the most famous hybrids is the Bartram Oak, *Q. heterophylla* Michaux f. (Hist. Arb. Am. II. 87. 1812) originally from the vicinity of Bartram's residence below Philadelphia. This tree is frequent throughout West Jersey, south to Cape May. Specimens have been examined as follows:

Middle District.—Farmingdale, New Egypt, Arneys Mt. (S), Millville (S).

Cape May.—Green Creek, New England (OHB), Bennett.

Coast Strip.—Manahawkin.

While *Q. phellos* is one of the parents of this form the other is in doubt. It has usually been given as *Q. rubra*, but that is certainly not the case in New Jersey, and it seems more likely to be *Q. coccinea* or *Q. velutina*, which are fairly plentiful, while *Q. rubra* is extremely rare. Perhaps the so-called *Q. heterophylla* is not all of similar origin. Some specimens somewhat pubescent below may easily be *Q. phellos* x *triloba*.

An oak with larger, irregularly toothed leaves is *Q. rudkini* Britton (Bull. Torrey Club IX. 13. 1882—Keyport, N. J.) supposed to be a cross between *Q. phellos* and *Q. marilandica*. This I have seen from

Middle District.—Keyport, Cliffwood, Mickleton, Medford (S), Swedesboro, Tomlin, Salem (S).

Cape May.—Green Creek.

Between this and the preceding there is no very sharply defined line.

A narrow-leaved, irregularly lobed form collected near Woodbury by Mr. Isaac Burk, has the leaves white beneath, and is, I

think, as he suggests, *Q. phellos* x *Q. ilicifolia*. A hybrid between these two is also mentioned by J. E. Peters in Torrey Bull. XX. 295, from Mays Landing.

Mr. W. T. Davis has described as *Q. brittoni* a hybrid between *Q. marilandica* and *Q. ilicifolia*, from Watchogue, Staten Island (Bull. Torrey Club XIX. 301. 1892). He states that the specimens vary greatly, forming a perfect connecting series between the two. To this category no doubt belong numerous scrub oaks growing on the "Plains" where these two species abound, although I have always been in doubt whether they were not merely extreme types of variation.

At Medford I found one tree of another hybrid, *Q. velutina* (or *coccinea*) and *Q. triloba*. The leaf outline that of the former, with only an occasional tendency toward an elongated central lobe, but with the under side densely gray, pubescent like *triloba*.

Several curious chestnut oaks occur at Mullica Hill, Swedesboro, etc., with very deep acute marginal dentations on the leaves, resembling those of *Q. acuminata*, but obviously not that species.

We have also an oak at Riddleton, which has passed for *Q. lyrata*, but I suspect may be of hybrid origin, though it bears acorns plentifully, as does *Q. rudkini*. The leaves are similar to *lyrata* and as white beneath as *Q. bicolor*. At Pemberton Junction I found a similar tree growing near *Q. bicolor*, and beside it another with similar leaf outline, but leaves thinner and the downy lower surface dull grayish-green.

Order URTICALES.

Family ULMACEÆ. Elms and Hackberries.

- a. Fruit a winged seed, twigs and trunk not warty. *Ulmus*, p. 412
 aa. Fruit a drupe, twigs and trunk usually with warty excrescences. *Celtis*, p. 413

ULMUS L.

Ulmus americana L. White Elm.

Ulmus americana Linnæus, Sp. Pl. 226. 1753 [Virginia].—Knieskern 27.—Britton 216.

Low ground, especially along rivers; common in the Northern district and less abundant southward in the Middle district.

Mainly restricted to the shores of large rivers or their tributaries, or to low meadowland.*

Fl.—Late March to early April, before the leaves expand. *Fr.*—Late April to mid-May, when the leaves are partly expanded.

Middle District.—Farmingdale, Pt. Pleasant (S), Bordentown, Pemberton Inc. (S), Moorestown, Medford (S), Mickleton, Atco (C), Salem (C).

CELTIS L.

Celtis occidentalis L. Hackberry.

Celtis occidentalis Linnæus, Sp. Pl. 1044. 1753 [Virginia].—Barton, Fl. Phila. I. 151. 1818.—Knieskern 27.—Willis 54.—Britton 216.

Frequent in woods and thickets of the Middle, Coast and Cape May districts, and occasional northward. Absent from the Pine Barrens.

The tree of the coast strip has rather small, practically glabrous, leaves, and the same form occurs in the Middle district, but there occur with it trees with very rough, usually larger, leaves, and others with larger leaves which are nearly glabrous. The length of both pedicels and petioles varies greatly. While I at one time supposed that both *C. georgiana* and *C. crassifolia* occurred in our region, I have found it impossible to separate our material, the characters being so variable and occurring in such different combinations, so it was thought best to record all of them under *C. occidentalis*.

Fl.—Late April to late May, when the leaves are expanding. *Fr.*—Late August into early autumn.

Middle District.—Leedsville, Mon. Co. (NB), Crosswicks, Fish House (S), Camden, Merchantville, Oaklyn (S), Gloucester, Lawnside (S), Woodbury, Salem (S).

Coast Strip.—Sandy Hook, Toms River (Kn), Barnegat City (L), Surf City (L), St. Albans (L), West Creek (S), Absecon (Bassett), Pleasantville (NY), Piermont (S), Anglesea (UP).

Cape May.—Goshen, Court House, Dias Creek (S).

* *Ulmus fulva* Michx., a tree of the northern counties is said by Willis to occur in Monmouth county, and Dr. Britton gives it in his list from Clementon (H. A. Green). All Elms from the latter vicinity seem to be *U. americana*, however, and we have seen no specimen of *U. fulva* from within our limits

Family MORACEÆ. Mulberries.

Key to the Species.

- a. Staminate and pistillate flowers in spikes.
 - b. Leaves rough above, pubescent beneath, fruit purple. *Morus rubra*, p. 414
 - bb. Leaves glabrous, fruit whitet. [*M. alba*]*
- aa. Pistillate flowers capitate. [*Broussonetia papyrifera*]†

MORUS L.

Morus rubra L. Red Mulberry.

Morus rubra Linnæus, Sp. Pl. 986. 1753 [Virginia].—Knieskern 27.—Britton 217.

Frequent in woods of the Northern district, occurring less abundantly within our limits and confined to the upper part of the Middle district and the coast strip south to Cape May County.

Fl.—Mid-May to late May, when the leaves are partly expanded. *Fr.*—Late June to early July.

Middle District.—Keyport (C), Pemberton (C), Medford (S), Mickleton, below Millville.

Coast Strip.—Piermont (S), Court House (S).

The record at Winslow, in Britton's catalogue, refers to an introduced tree.

Family URTICACEÆ. Nettles.

Key to the Species.

- a. Herbs with stinging hairs.
 - b. Leaves alternate. *Urticastrum*, p. 415
 - bb. Leaves opposite.
 - c. Length of petiole exceeding half the breadth of the leaf. *U. gracilis*, p. 415
 - cc. Length of petiole less than half the breadth of the leaf. [*U. dioica*]‡
- aa. Herbs without stinging hairs.
 - b. Flowers in axillary clusters, surrounded by leafy bracts. *Parietaria*, p. 416
 - bb. Flowers in naked axillary clusters, plant shining, and pellucid. *Adicea*, p. 415
 - bbb. Flowers in dense slender axillary or terminal spikes, plant not pellucid. *Boehmeria*, p. 415

* White Mulberry, an escape about houses.

† Paper Mulberry, an escape.

‡ Stinging Nettle, a weed in waste ground, etc.

URTICA L.

Urtica gracilis Ait. Slender Nettle.

Urtica gracilis Aiton, Hort. Kew. III. 341. 1789 [Hudson Bay].—Britton 217.—Keller and Brown 126.

Common in the northern counties, but barely enters our region.

Middle District.—Bordentown (C).*

URTICASTRUM Fabricius.

Urticastrum divaricatum (L.). Wood Nettle.

Urtica divaricatum Linnæus, Sp. Pl. 985. 1753 [Virginia and Canada].
Laportea canadensis Britton 218.

Common in the northern counties, but rare within our limits, occurring only along the Delaware and on the Coast.

Fl. and Fr.—Mid-August to mid-September.

Middle District.—Kinkora (NY), Delair, Fish House, Camden (CP), Mullica Hill (C), Swedesboro, New Egypt.

ADICEA Rafinesque.

Adicea pumila (L.). Clearweed.

Urtica pumila Linnæus, Sp. Pl. 984. 1753 [Canada].
Pilea pumila Britton 218.

Damp shady places; most common northward, but occurs locally throughout the Middle district and in the Cape May peninsula.

Fl. and Fr.—Late July to late September.

Middle District.—New Egypt, Birmingham, Hartford, Fish House, Kinkora (NY), Springdale (S), Clementon (NB), Oaklyn (S), Lawnside (S), Washington Park.

Cape May.—Cape May.

BOEHMERIA Jacquin.

Boehmeria cylindrica (L.). False Nettle.

Urtica cylindrica Linnæus, Sp. Pl. 984. 1753 [Jamaica, Virginia and Canada].
Boehmeria cylindrica Britton 218.

Common northward and down the Coast strip to Cape May County; less frequent in the Middle district and very rare in

* Mr. Lippincott informs me that the specimens credited to Swedesboro on his authority (KB) came from Pennsylvania.

the Pine Barrens. Apparently the majority of our material is referable to *B. c. drummondiana* Weddell (Ann. Sci. Nat., 4 Ser: 201-1854—Texas).*

Fl. and *Fr.*—Early July to early September.

Middle District.—New Egypt, Fish House, Camden (Bassett), Kaighns Pt., Medford (S), Mickleton (H), Salem (S).

Pine Barrens.—Hammonton.

Coast Strip.—Surf City (L), Mays Landing (S), Ocean City (S), Holly Beach (UP), Cold Spring (S), Cape May Court House.

PARIETARIA L.

Parietaria pennsylvanica Muhl. Pellitory.

Parietaria pennsylvanica Muhlenberg in Willdenow, Sp. Pl. IV. 955. 1806 [Pennsylvania].—Willis 55.—Britton 218.—Keller and Brown 127.

Occasional on cliffs and rocky places northward; obtained but once within our limits.

Coast Strip.—Sandy Hook (NY), [Ruger July 5, 1870].

Order SANTALALES.

Family LORANTHACEÆ. Mistletoes.

PHORADENDRON Nuttall.

Phoradendron flavescens (Pursh.). Mistletoe.

Viscum flavescens Pursh, Fl. Am. Sept. 114. 1814 [North America].

Phoradendron flavescens Knieskern 27.—Britton 213.—Keller and Brown 127.

Formerly frequent through much of the Middle district and occasional on the edge of the Pine Barrens, but now nearly exterminated in the State. Monmouth County was the most northern known station for the plant.

Comparatively little has been left on record regarding this interesting plant, now all but exterminated in the State. The most northern station was three and a half (or four) miles north of Keyport, near the shore of Raritan Bay, where it grew on an old Liquidambar according to Rev. Saml. Lockwood, as late as 1864, when the plant formed a mass as big as a bushel measure. By

* Cf. Fernald Rhodora XII, p. 11.

1880, it was gone, although the tree still remained.* Mr. I. H. Hall recorded a specimen forty feet up on a Red Maple two feet in diameter at the base, growing on the edge of the Pines May 3, 1872.†

It also grew in 1884 between Trenton and New Brunswick and at Lakewood.‡ In July, 1891, I found a large bunch, over a foot in diameter, growing on a gum tree (*Nyssa sylvatica*) below Clementon.

In the Martindale Herbarium, at the Philadelphia College of Pharmacy, are specimens collected at Kaighn's Point, September, 1860; Camden, June 15, 1874; Atco, May, 1878, and Mays Landing, July 4, 1888.

It still grows on a tree at Fenwick, carefully guarded by the colored people who live close by and make a profit by selling it. It also grows on a certain Red Maple not far from Medford, though it rarely reaches a height of more than one inch. If it grew larger it would, no doubt, suffer the fate of the berry-bearing Holly of the neighborhood and find its way to the street corners of Philadelphia at Christmas time.

In the central Mississippi Valley the Mistletoe is regularly killed off by severe winters, but several mild seasons will restore it to its former abundance.

In that neighborhood, and doubtless in New Jersey as well, it blooms September 15—October 25, while the fruit matures during November of the following year, remaining on the branches well through the winter.§

Middle District.—Four miles north Keyport (C), New Lisbon (C), Medford, Clementon, Kaighns Pt. (P), Glassboro, Woodbury (C), Mickleton (H), Swedesboro, Atco (CP), Vineland (C), Fenwick, Riddleton, Woodstown (C), Bridgeton (C), Millville (KB).

Pine Barrens.—Lakewood (NB), Hammonton, Landisville (T), Jackson (P), Mays Landing (NY).

* Torrey Bulletin XI., p. 87.

† Torrey Bulletin III., p. 25.

‡ Torrey Bulletin XI., p. 76.

§ cf. Schneck. Botanical Gazette IX., 1884, p. 94.

Family SANTALACEÆ. Sandalwood, etc.

COMANDRA Nuttall.

Comandra umbellata (L.). False Toad-flax.*Thesium umbellatum* Linnæus, Sp. Pl. 208. 1753 [Virginia and Pennsylvania].*Comandra umbellata* Knieskern.—Britton 214.

Common throughout the State in sandy ground, most plentiful in the Middle district.

Fl.—Mid-May to late June. *Fr.*—Apparently not very common.

Middle District.—Farmingdale, New Egypt, Browns Mills, Delanco, Washington Park, Sewell (S), Lindenwold (S), Mickleton, Sicklerville (S), Swedesboro, Yorktown, Dividing Creek.

Pine Barrens.—Forked River, Manahawkin, Sumner, Landisville, Hammononton (Bassett), Absecon (P).

Cape May.—Burleigh (OHB).

Order ARISTOLOCHIALES.

Family ARISTOLOCHIACEÆ. Birthwort, etc.

Key to the Species.

a. Leaves reniform, paired, flower growing from between the petioles.

Asarum, p 418

aa. Leaves ovate lanceolate, alternate on a somewhat zig-zag stem.

Aristolochia, p. 418

ASARUM L.

Asarum canadense L. Wild Ginger.

Asarum canadense Linnæus, Sp. Pl. 442. 1753 [Canada].—Britton 212.

Rich woods; common northward, rare and local within our limits and confined to the upper Middle district.

Fl.—Late April to late May.

Middle District.—Freehold (C), New Egypt, Pemberton (NB), Bordentown (C), Camden Co. (C), Swedesboro.

ARISTOLOCHIA L.

Aristolochia serpentaria L. Virginia Snakeroot.

Pl. LXVI., Fig. 3.

Aristolochia serpentaria Linnæus, Sp. Pl. 961. 1753 [Virginia].—Barton Fl. Phila. II. 146. 1818.—Britton 212.

Not very plentiful, and locally distributed in the Northern and Middle districts and rarely in the Cape May peninsula.

Fl.—Early June to early July. *Fr.*—Late July to late August.

Middle District.—Keyport (C), Holmdel (C), Haddonfield, Medford, Mantua, Mullica Hill (H), Malaga (S), Swedesboro, Riddleton, Locust Grove.

Cape May.—Cold Spring (OHB).

Order POLYGONALES.

Family POLYGONACEÆ. Buckwheats, Smartweeds, etc.

a. Calyx of six parts, the three inner ones often developing into wings, one or all of them bearing a tubercle.

b. Leaves hastate, flowers dioecious, plants not over 4 dm. high.

c. Inner sepals not developing wings. [*R. acetosella*]*

cc. Inner sepals developing wings. *R. hastatulus*, p. 421

bb. Leaves not hastate, flowers perfect, tall plants.

c. Leaves flat, edges not crisped, pedicels clavate.

R. verticillatus, p. 421

cc. Leaves crisped on the edges.

d. Wings of fruiting calyx entire, somewhat undulate.

[*R. crispus*]*

dd. Wings of fruiting calyx toothed or fringed.

[*R. obtusifolius*]*

aa. Calyx five parted, leaves very slender linear, or almost filiform, pedicels solitary. *Polygonella*, p. 427

aaa. Calyx four or five parted, leaves not filiform, pedicels usually in fascicles.

b. Flowers in terminal spike-like racemes, calyx five parted.

c. Raceme solitary or two, aquatic plants. *Polygonum emersum*, p. 421

cc. Racemes several or numerous.

d. Ocreæ (sheathing the joints) naked or ciliate.

e. Racemes drooping. [*P. lapathifolium*]*†

ee. Racemes erect.

f. Stem glandular below the inflorescence.

P. pennsylvanicum, p. 422

ff. Stem glabrous below the inflorescence.

P. eciliatum, p. 423

dd. Ocreæ fringed with bristles.

e. Racemes dense, not interrupted.

f. Racemes erect.

g. Leaves 65 x 12 mm., bristles 3 mm. long, flowers deep red, in waste ground. [*P. persicaria*]*‡

gg. Leaves 35 x 10 mm., bristles 6 mm. long, flowers white, usually strongly tinged with pink.

* *R. crispus* Yellow Dock, *R. obtusifolius* Bitter Dock, *R. acetosella* Horse Sorrel, common weeds about cultivated and waste ground.

† Dock-leaved Smartweed, apparently always an introduced weed.

‡ Lady's Thumb.

- h. Calyx lobes entirely covering the achene. *P. hydropiperoides*, p. 422
- hh. Calyx lobes shorter than the achene. *P. h. opelousanum*, p. 422
- ggg. Leaves 150 x 20 mm., bristles 12 mm. long, flowers usually whitish. *P. setaceum*, p. 424
- ff. Racemes slender, interrupted. *P. careyi*, p. 422
- ce. Racemes slender, interrupted.
- f. Achene dull. [*P. hydropiper*]*
- ff. Achene smooth and shining.
- g. Leaves hispid above 150 x 20 mm. *P. setaceum*, p. 424
- gg. Leaves glabrous.
- h. Leaves 100 x 15, plant medium. *P. punctatum*, p. 423
- hh. Leaves 140 x 35, plant tall. *P. p. robustius*, p. 423
- bb. Flowers in a very long terminal, naked, interrupted raceme, calyx four parted, leaves ovate, acuminate. *P. virginianum*, p. 424
- bbb. Flowers axillary or in small axillary clusters, plants prostrate or erect.
- c. Plants prostrate.
- d. Foliage nearly white, maritime. *P. maritimum*, p. 424
- dd. Foliage bluish green. *P. aviculare*, p. 424
- cc. Plants erect.
- d. Stems sharply angled, leaves linear. *P. tenue*, p. 425
- dd. Stems terete.
- e. Leaves elliptic obtuse. *P. erectum*, p. 424
- ee. Leaves lanceolate acute.
- f. Pedicels exserted, leaves lanceolate, acute. *P. atlanticum*, p. 425
- ff. Pedicels covered by the sheaths, leaves linear, oblong, often obtuse. *P. prolificum*, p. 425
- bbbb. Flowers in axillary and terminal clusters or paniced racemes, climbing vines.
- c. Outer segments of fruiting calyx keeled, not winged. [*P. convolvulus*]*
- cc. Outer segments of fruiting calyx winged. *P. scandens*, p. 426
- bbbb. Flowers in capitate clusters or racemes, stems covered with recurved prickles.
- c. Leaves sagittate. *P. sagittatum*, p. 426
- cc. Leaves halberd-shaped. *P. arifolium*, p. 426

* All the *Polygonums* seem to have a tendency to become weeds. *P. aviculare*, *P. erectum*, *P. pennsylvanicum* and *P. careyi*, while natives of North America, seem to be entirely weeds, to-day, within our limits, and to these may be added *P. hydropiper*, Common Smartweed, *P. persicaria*, Lady's Thumb, and *P. convolvulus*, Black Bindweed, all common in waste or cultivated ground, and all natives of Europe, though the first does occur native in the northwest. The brilliant crimson-spiked Prince's Feather, *P. orientale*, of old garden, sometimes escapes into waste ground.

RUMEX L.*

Rumex verticillatus L. Swamp Dock.

Rumex verticillatus Linnæus, Sp. Pl. 334. 1753 [Virginia].—Knieskern 26.
—Britton 211.—Keller and Brown 128.

Damp shaded spots throughout the State, except in the Pine Barrens, apparently not common.

Fr.—Early June to early August.

Middle District.—Medford (S), Salem (H).

Coast Strip.—Piermont (S), Wildwood, Holly Beach.

Cape May.—Nummerytown (S), Green Creek (OHB).

Rumex hastatulus Bald. Engelmann's Sorrel.

Rumex hastatulus Baldwin, Elliot, Fl., S. C. and Ga. II., p. 416, 1821
[Georgia and E. Florida].—Crawford, Bartonian I. 18. 1909.

Known only from the sand hills at Longport, where it was discovered in August, 1890, by Mr. Charles E. Smith, and later reported by Messrs. Joseph Crawford and Stewardson Brown, who found it in abundance June 23, 1907.

Fr.—Mid-June to late August.

Coast Strip.—Longport.

POLYGONUM L.†

Polygonum emersum (Michx.) Swamp Smartweed.

Polygonum amphibium var. *emersum* Michaux, Fl. Bor. Am. I. 240. 1803
[Banks of the Ohio].

Polygonum coccineum Barton, Fl. Phila. I. 188. 1818.

Polygonum emersum Britton 209.—Keller and Brown 130.

Borders of swamps and ditches; frequent in the northern counties and south to about the center of the Middle district, reappearing in the southern part of the Cape May peninsula.

Fr.—Late August to late September.

Middle District.—Mickleton (NB), Repaupo.

Pine Barrens.—Ancora (Bassett). Native?

Cape May.—Bennett.

* Knieskern's record of "*R. maritimus* salt marshes of Ocean and Monmouth counties, not rare," has not been verified; both it and the records of *R. brittanica* for Anglesea (KB) are probably referable to *R. verticillatus*.

† For studies of this genus cf. Robinson, Rhodora, April, 1902, p. 63, Small, Torrey Bulletin XX. 214, XXI. 168, XXI. 476.

Polygonum pensylvanicum L. Pennsylvania Smartweed.

Polygonum pensylvanicum Linnæus, Sp. Pl. 362. 1753 [Pennsylvania].—Knieskern 26.—Britton 209.

Common throughout the State. While a native plant of eastern North America, this is one of those species which have found themselves perfectly adapted for existence in cultivated and waste ground, and has thus become a weed to such an extent that all record of its original habitat and distribution has been lost. It seems useless to cite localities, as it occurs in waste and cultivated ground everywhere, even on the coastal islands.

Fr.—Early August to late September or into October.

Polygonum careyi Olney. Carey's Smartweed.

Polygonum Careyi Olney, Proc. Prov. Franklin Soc. I. 29. 1847 [Providence, R. I.].—Willis 52.—Britton 208.—Keller and Brown 130.

Frequent in sandy swamps of the northern counties and now spreading over the southern half of the State as a weed. Whether originally native within our limits it is impossible to say.

Fr.—Mid-July into September.

Middle District.—Pemberton (C), Browns Mills, Medford (S), Haddonfield, Mickleton.

Pine Barrens.—Manchester, Winslow (P), Landisville (T), Hammonton (C), Egg Harbor City.

Coast Strip.—Ocean Grove (P), Toms River (C).

Polygonum hydropiperoides Michx. Mild Smartweed.

Polygonum hydropiperoides Michaux, Fl. Bor. Am. I. 239. 1803 [Pennsylvania, Virginia and Carolina].—Britton 209.

Swamps of the Middle and Coast districts to Cape May; common. Apparently less abundant northward and absent from the Pine Barrens.

Fr.—Late July to late September or into October.

Middle District.—New Egypt, Birmingham, Bear Swamp (S), Ballengers Mills (S), Clementon, Repaupo, Mickleton, Sharpstown, Salem (S).

Coast Strip.—Manahawkin, Ocean City, Cold Spring (S).

Polygonum hydropiperoides opelousanum Riddell. Riddell's Smartweed.

Polygonum Opelousanum "Riddell" Small, Bull. Torr. Bot. Club XIX. 354. [Opelousas, La.].

Rather frequent in the Middle and Coast districts.

Fr.—Apparently similar to the last.

Middle District.—Delanco.

Coast Strip.—Surf City (L), Ocean City, Cold Spring, Cape May Ct. House.

Polygonum punctatum Ell. Dotted Smartweed.

Polygonum punctatum Elliot, Bot. S. C. and Ga. I. 455. 1817 [South Carolina].

Swamps; common throughout the State, except in the Pine Barrens, where it is absent.

Fr.—Late July to late September or into October.

Middle District.—New Egypt, Fish House, Masonville, Medford (S), Swedesboro, below Washington Park (S), Beaver Dam.

Coast Strip.—Seaside Park, Island Hts. Inc., N. Beach Haven (L), Ship Bottom (L), Surf City (L), Holgate's (L), Atlantic City (S), Ocean City, Piermont (S), Cape May Ct. House, Cape May (S).

Polygonum punctatum robustius Small. Larger Dotted Smartweed.

Polygonum punctatum robustius Small, Bull. Torr. Bot. Club XXI. 477. 1894 [Mass. to Mexico and S. A.].

At one station in the Middle district, probably elsewhere. A well marked large and robust form of *P. punctatum*.

Middle District.—Moorestown.

Polygonum eciliatum (Small). Bristleless Smartweed.

Polygonum punctatum var. *eciliatum* Small, Bull. Torrey Bot. Club XX. 214. 1893 [Valley of Toluca Mex.]

Borders of ponds in the lower Cape May peninsula and lower coast islands; local.

This handsome *Polygonum* was discovered by Mr. Alexander McElwee September 11, 1892, at Wildwood. He proposed to describe it as new, but for some reason did not do so, and his manuscript description is still attached to the specimen in the Philadelphia Academy herbarium. On September 5, 1909, Mr. C. S. Williamson collected it at West Cape May. The pink flowers are quite showy.

Fr.—Late August to late September.

Coast Strip.—Wildwood.

Cape May.—West Cape May.

Polygonum setaceum Baldwin. Bristly Smartweed.

Polygonum setaceum "Baldwin" Elliott, Bot. S. C. and Ga. I:455. 1817 [Savannah.]

Damp ground in the lower part of the Cape May peninsula; locally common.

First obtained in the State by the writer September 6, 1909, on the borders of a stream east of Cape May Court House.

Fr.—Late August, probably into October.

Cape May.—Court House, Dias Creek.

Polygonum virginianum L. Virginia Knotweed.

Polygonum virginianum Linnæus, Sp. Pl. 360. 1753 [Virginia].—Britton 209.

Common in woods of the northern counties, south locally in the Middle district and rarely in the Cape May peninsula.

Fr.—Early August into October.

Middle District.—New Egypt, Haddonfield (S), Springdale (S), below Washington Park (S), Mickleton, Swedesboro.

Cape May.—Court House (OHB).

Polygonum aviculare L. Knotgrass.

Polygonum aviculare Linnæus, Sp. Pl. 362. 1753 [Europe].—Britton 210.

Common in cultivated and waste ground throughout the State; although of native origin it has become a typical weed, and citation of localities seems useless.

Fr.—Late August into October.

Polygonum erectum L. Erect Knotweed.

Polygonum erectum Linnæus, Sp. Pl. 363. 1753 [Philadelphia].—Britton 210.

Polygonum aviculare var. *erectum* Knieskern 26.

Similar in distribution and history to the last species.

Fr.—Late August into October.

Polygonum maritimum L. Seaside Knotweed.

Polygonum maritimum Linnæus, Sp. Pl. 361. 1753 [Italy and Virginia].—

Willis 52.—Britton 210.—Keller and Brown 131.

Polygonum glaucum Nuttall, Man. I. 254. 1818 [Egg Harbor, N. J.].

Sands of the sea beaches, but apparently not common.

The plant here referred to is often whitish and always with silvery sheaths. Other prostrate *Polygonums* occur along

the coast, probably introduced, to some extent at least. It is impossible, with the material at hand, and the rather involved condition of the synonymy of this group, to positively settle their identity.

Maritime.—Long Branch, Waretown, Angelsea, Cape May.

***Polygonum prolificum* (Small). Bushy Knotweed.**

Polygonum ramosissimum var. *prolificum* Small, Bull. Torr. Bot. Club, XXI. 171. 1894 [Exeter Neb.].

Polygonum prolificum Bicknell, Bull. Torr. Bot. Club XXXVI. 449.

Coast district frequent.

Fr.—Early September into October.

Maritime.—Spring Lake, Forked River, Harvey Cedars (L), Spray Beach (L), Beach Haven Terrace (L), Cedar Bonnet (L), Sea Isle City, Stone Harbor, Cape May.

***Polygonum atlanticum* (Robinson). Atlantic Knotweed.**

Polygonum ramosissimum forma *atlanticum* Robinson, Rhodora IV: 72. 1902 [Edgartown, Mass.].

Polygonum ramosissimum Britton 210.—Keller and Brown 131.

Frequent along the coast. I agree with Mr. Bicknell that *P. exsertum* represents a plant in which the embryos are developing prematurely in the seeds.

Fr.—Early September into October.

Maritime.—Seaside Park, Barnegat Pier, Barnegat City Inc. (L), Harvey Cedars (L), Spray Beach (L), Ship Bottom (L), Surf City (L).

***Polygonum tenue* Michx. Slender Knotweed.**

Polygonum tenue Michaux, Fl. Bor. Am. I. 238. 1803 [Canada].—Pursh, Fl. Am. Sept. I. 270. 1814.—Britton 210.

Polygonum linifolium Barton, Fl. Phila. I. 186. 1818.

Frequent in dry ground in the Northern and Middle districts, and occasional on the coast and on the Cape May peninsula.

Fr.—Mid-August to early October.

Middle District.—Keyport (C), New Egypt, Florence Heights, Birmingham, Camden (CP), Woodbury, Oaklyn (S), Mullica Hill (NB), Mickleton (H), Swedesboro, Bridgeton.

Pine Barrens.—Landisville, introduced?

Coast Strip.—Forked River.

Cape May.—Dias Creek, Cold Spring (OHB).

Polygonum scandens L. Climbing Bindweed.

Polygonum scandens Linnæus, Sp. Pl. 364. 1753 [America].

Polygonum dumetorum Knieskern 26.

Polygonum dumetorum var. *scandens* Britton 210.

Common in swamps and thickets of the Northern and Middle districts, also down the coast and at Cape May. This seems to be the only form of trailing bindweed found native in our region.

Fr.—Late August to early October.

Middle District.—New Egypt, Medford (S), Orchard (S), Springdale (S), Haddonfield (S), Lawnside (S), below Washington Park (S), Mickleton.

Coast Strip.—Forked River, Surf City (L), N. Beach Haven (L), Barrel Island (L), Holly Beach, Cape May (OHB).

Polygonum sagittatum L. Arrow-leaved Tear-thumb.

Polygonum sagittatum Linnæus, Sp. Pl. 363. 1753 [Virginia and Maryland].

—Knieskern 26.—Britton 210.

Common in swamps of the Northern, Middle and Coast districts down to Cape May.

This species and the following are two of the plants of late summer which give to the swamps of west Jersey a character which at once contrasts them with the bogs of the Pine Barrens. Associated with these Tear-thumbs are usually found *Eupatorium perfoliatum*, and *maculatum*, *Iernonia noxeboracensis*, several species of *Bidens*, *Aster puniceus*, etc., all of them lacking from the Pines.

Fr.—Mid-August to mid-September.

Middle District.—New Egypt, Delaire, Hartford, Birmingham, Lindenwold (S), Medford (S), Albion, Willow Grove, Mickleton.

Coast Strip.—Waretown, Forked River, Manahawkin, Coxe's, Crowleystown.

Cape May.—Cold Spring.

Polygonum arifolium L. Halberd-leaved Tear-thumb.

Polygonum arifolium Linnæus, Sp. Pl. 364. 1753 [Virginia and Florida].—

Michaux, Fl. Bor. Am. I. 241. 1803.—Knieskern 26.—Britton 210.

Common in swamps of the Northern and Middle districts and less commonly in the Coast Strip and Cape May peninsula.

Fr.—Late August to late September.

Middle District.—New Egypt, Birmingham, Kinkora (NY), Hartford, Pensauken (S), Fish House, Delair, Medford (S), Springdale (S), Oaklyn, Kaighns Pt., Lindenwold (S), Center Square.

Coast.—Cox's, May Landing (T).

Cape May.—Court House (OHB), Green Creek (S).

POLYGONELLA Michaux.

Polygonella articulata (L.). Jointweed.

Polygonum articulatum Linnæus, Sp. Pl. 363. 1753 [Canada].—Muhlenberg Cat. 40. 1813.—Pursh, Fl. Am. Sept. I. 272. 1814.—Barton, Fl. Phila. 189. 1818.—Knieskern 26.—Willis 52.—Britton 210.

Polygonella articulata Keller and Brown 132.

Frequent in dry sandy soil throughout our area and only occurring north of it at one locality in Middlesex Co.

This is a striking plant of autumn in dry ground, especially along the coast and in the Pines. The leaves are so inconspicuous that the plant seems to consist entirely of slender racemes of little white flowers supported on wiry stems.

Fl.—Early September well through October. *Fr.*—Develops almost immediately.

Middle District.—New Egypt, Hainesport, Medford, Locust Grove (S), Springdale (S), Lindenwold, Ashland, Camden, Center Square, below Washington Park (S), Woodbury, Mickleton, Swedesboro.

Pine Barrens.—Whitings (S), Chatsworth, Clementon, Taunton (S), Kenilworth (S), Cedar Brook, Jones Mill (S), Batsto, Pleasant Mills, north of Batsto, Berlin (S), Albion, Buena Vista, May's Landing.

Coast Strip.—Sandy Hook, Island Heights, Seaside Park (S), Forked River, Manahawkin, Surf City (L), Spray Beach (L), Atlantic City, Ocean City (S), Anglesea (UP).

Cape May.—Cape May.

Order CHENOPODIALES.

Family CHENOPODIACEÆ. Goosefoot, etc.

Key to the Species.

a. Embryo coiled in a ring about the albumen, leaves flat, not spiny.

b. Stem not jointed.

c. Flowers perfect or some pistillate.

d. Fruiting calyx not winged, flowers in panicle spikes.

e. Leaves whitish, mealy on the under surface.

f. Some at least sinuate-toothed or lobed.

[*Chenopodium album*]*

ff. Entire, linear or oblong.

C. leptophyllum, p. 428

cc. Leaves green on both sides.

f. Not glandular or aromatic.

g. Stamens 5, calyx not fleshy. *C. boscianum*, p. 429

gg. Stamens 1-2, calyx somewhat fleshy, red.

C. rubrum, p. 429

* *C. album*, Pigweed, and *C. ambrosioides*, are common about barnyards and other waste places.

- ff. Glandular and aromatic. [C. ambrosiodes]
 dd. Fruiting calyx winged all around. [Cycloloma atriplicifolium]*
 cc. Flowers monoecious or dioecious, calyx wanting on pistillate flowers, fruit enclosed by two bractlets.
 d. Leaves green, triangular hastate. *Atriplex hastata*, p. 429
 dd. Leaves densely silvery, oblong. *A. arenaria*, p. 430
 aa. Embryo narrowly horseshoe-shaped or conduplicate, no albumen stems, cylindrical, fleshy jointed with opposite branches, leaves practically none, flowers sunk in hollows of the spike.
 b. Annuals, no woody rootstalk.
 c. Scales mucronate pointed, stems thick. *Salicornia bigelovii*, p. 431
 cc. Scales blunt, stems more slender. *S. europæa*, p. 430
 bb. Perennial, stems rising from a woody root stalk. *S. ambigua*, p. 431
 aaa. Embryo coiled in a spiral, albumen scarcely any, leaves fleshy.
 b. Leaves very spiny. *Salsola kali*, p. 433
 bb. Leaves not spiny.
 c. Branchlets, etc., hairy. *Bassia hirsuta*, p. 432
 cc. Branchlets glabrous.
 d. Seeds 2 mm. broad. *Dondia maritima*, p. 432
 dd. Seeds 1.2-1.5 mm. broad. *D. linearis*, p. 432

CHENOPODIUM L.

Chenopodium leptophyllum (Moq.). Narrow-leaved Goosefoot.

Chenopodium album var. *leptophyllum* Moquin in D. C. Prod. XIII., pt. 2. 71. 1849 [New California].

Chenopodium leptophyllum Britton 206.—Keller and Brown 133.

Found only on the coast from Sandy Hook to Wildwood. Originally discovered on "Absecon Beach" [= Atlantic City] by D. C. Eaton in 1860, and by E. Diffenbaugh at about the same time or earlier. Their station was no doubt in the wooded tract near Ventnor, as the other stations farther south are both on wooded islands.

This is a boreal species extending down the coast from Maine, and is one of several northern species which are found in southern New Jersey only on the coast islands. Dr. Britton's statement that this and the following are adventive form farther west does not seem to be correct in light of our present knowledge.

Coast Strip.—Sandy Hook (NB), Barnegat City (L), Barrel Island (L), Absecon Beach (NB), Atlantic City (C), Avalon (KB), Five-Mile Beach.

* *Cycloloma*, Winged Pigweed, has been introduced at Holly Beach and Ocean City.

Chenopodium boscianum Moq. **Bosc's Goosefoot.**

Chenopodium Boscianum Moquin-Tandon, Enum. Chenopod. 21. 1840 [Carolina].—Britton 206.—Keller and Brown 133 (in part equals the preceding).

Banks of the upper Delaware; apparently rare and known only from Milford, Hunterdon Co., and Florence Heights, Burlington Co.

The records for Five Mile Beach (Leeds) and Ventnor (Githens), given in Keller and Brown's list, refer to *C. album* or the preceding.

Flowers and immature fruit in August.

Middle District.—Florence Heights.

Chenopodium rubrum L. **Red Goosefoot.**

Chenopodium rubrum Linnæus, Sp. Pl. 218. 1753 [Europe].—Britton 207.—Keller and Brown 134.

Blitum maritimum Knieskern 26.—Willis 51.

Salt meadows on the coast; rare.

This plant reaches the southern limit of its range on the New Jersey coast, where it seems to be very rare or very local, as only one station is known. It is true that it has been mentioned in all the lists,* but apparently without any definite knowledge of its occurrence, and I have been unable to find any specimens in the herbaria that I have examined except those collected by Mr. Bayard Long on Barrel Island, near Tuckerton, September 11, 1908.

Maritime.—Barrel Isl. (L.).

ATRIPLEX L.**Atriplex hastata** L. **Halberd-leaved Orache.**

Pl. LVII., Fig. 1.

Atriplex hastata Linnæus, Sp. Pl. 1053. 1753 [Europe].—Knieskern 26.—Keller and Brown 134.

Atriplex patula var. *hastata* Willis 51.—Britton 207.

Atriplex patula Barton Fl. Phila. I. 148. 1818.

Common along the coast and Delaware river shore. Elsewhere as a weed on waste ground.

* Anglesea (Lippincott) and Cape May (Tenbrook) are given by Keller and Brown, but the former and perhaps the latter also proves to be *Atriplex hastata*.

Fl.—Late July to early September. *Fr.*—Early September to late October.

Middle District.—Salem (S).

Coast Strip.—Barnegat Pier, Surf City (L), Beach Haven (L), Spray Beach (L), Ocean City (S), Cold Spring (S), Cape May (S).

Atriplex arenaria Nutt. Sea Beach Orache.

Atriplex arenaria Nuttall, Gen. I. 198. 1818 [Coast of New Jersey].—Britton 207.—Keller and Brown 135.

Sandy beaches along the coast; frequent.

One of the characteristic plants of the upper part of the beach, and found throughout the entire length of the coast. Nuttall's original specimen was collected by Zaccheus Collins, who must have been one of the best informed botanists of any time upon the region here considered.

Fl.—Late July to late August. *Fr.*—Late August to early October.

Maritime.—Sandy Hook, Asbury Park, Long Branch, Island Beach, Surf City (L), St. Albans (L), Spray Beach (L), Tuckers (L), Atlantic City, Ocean City, Stone Harbor, Anglesea, Cape May, Cape May Pt. (S).

SALICORNIA L.

Salicornia europæa L. Slender Glasswort.

Pl. LV., Fig. 1.

Salicornia europæa var. *herbacea* Linnæus, Sp. Pl. 3. 1753 [Europe].

Salicornia herbacea Knieskern 26.—Willis 51.—Britton 207.—Keller and Brown 135.

Abundant on the salt marshes of the coast.

The upright succulent stems of this little plant cover many acres of the salt meadows, which stretch away like a green plain between the pine clad mainland and the shining sand spits which mark the location of the barrier islands along the coast, some surmounted by strips of woodland and most of them with the varied buildings of summer resorts, whose electric lights sparkle at night like myriads of stars when seen from far out on the meadows. These meadows are not as uniform as they at first sight appear. There are tracts where tall marsh grasses grow, where the mud-hen makes her nest, and lower grassy patches made up mostly of *Spartina* and *Juncus gerardi*, and these pass gradually into the still lower growth of the *Salicornia*, which

crunches under foot like crumbling glass when one walks over it, while hundreds of fiddler crabs sidle away in rank upon rank among the still upright stalks.

In autumn, when the plants reach maturity and frost is in the air, they turn a bright red, which rivals that of the autumn leaves in the upland forest, and gives to the meadows a brief period of brilliancy before all is wrapped in the brown carpet of late winter and early spring.

Fr.—Late October into November.

Maritime.—Sandy Hook, Long Branch, Barnegat Pier, N. Beach Haven (L), Surf City (S), Spray Beach (L), Holgate's (L), Absecon, Brigantine, Atlantic City, Ocean City (S), Sea Isle, Cape May (S).

***Salicornia bigelovii* Torr. Bigelow's Glasswort.**

Pl. LV., Fig. 2.

Salicornia Bigelovii Torrey, Bot. Mex. Bound. Survey. 184. 1859 [Salt marshes, Boston, Mass.].—Keller and Brown 135.

Salicornia Virginica Willis 51.

Salicornia mucronata Britton 208.

Coast marshes; associated with the preceding: plentiful, turning red in the autumn in the same way.

Fr.—Late October into November.

Maritime.—N. Beach Haven (L), St. Albans (L), Absecon, Atlantic City, Ocean City (S), Stone Harbor, Wildwood, Cape May.

***Salicornia ambigua* Michx. Woody Glasswort.**

Salicornia ambigua Michaux, Fl. Bor. Am. I. 2. 1803 [Coast of South Carolina].—Muhlenberg Cat. 2. 1813.—Pursh, Fl. Am. Sept. I. 3. 1814.—Knieskern 26.—Britton 208.—Keller and Brown 135.

Salicornia fruticosa var. *ambigua* Willis 51.

Wet sandy patches on the coast marshes; common. This species differs from the two preceding, not only in its woody root stock, but in the fact that it turns a leaden hue in autumn instead of bright red.

Fr.—Late October into November.

Maritime.—Sandy Hook (NB), N. Beach Haven (L), Holgate's (L), Halfway House south of Bond's (L), Atlantic City, Ocean City (S), Anglesea, Piermont, Cape May.

DONDIA Adanson.***Dondia maritima* (L.). Sea Blight.**

Pl. I. VI., Fig. 2.

Chenopodium maritima Linnæus, Sp. Pl. 221. 1753 [Sea coast of Europe].

Common on the coast marshes.

Fr.—Early September into November.*Maritime.*—Long Branch, Beach Haven Terrace (L), N. Beach Haven (L), Halfway House south of Bond's (L), Atlantic City, Ocean City, Anglesea, Cape May.***Dondia linearis* (Ell.). Tall Sea Blight.***Salsola linearis* Elliot, Bot. S. C. and Ga. I. 332 [Coast of South Carolina and Georgia].*Salsola salsa* Nuttall Gen. I. 199. 1818.*Suaeda maritima* Willis 51.*Suaeda linearis* var. *salsa* Britton 208.*Dondia americana* Keller and Brown 135.

Common on the coast marshes; apparently not so plentiful as the preceding.

Fr.—Early September into November.*Maritime.*—Sandy Hood, Halfway House south of Bond's (L), Atlantic City, Sea Isle City, Five-Mile Beach, Cape May.**BASSIA L.*****Bassia hirsuta* (Linn.). Hairy Sea Blight.***Chenopodium hirsuta* L. Syst. Nat. 221. 1753 [Coast of Europe].*Bassia hirsuta* Bartram, Bartonian II. 21. 1910.

Apparently frequent along the edge of the salt marshes.

This plant, identified as *Bassia hirsuta* by Prof. M. L. Fernald, and first recorded as such by Mr. E. B. Bartram in 1909, has been familiar to me for many years, but was always supposed to be a form of *Dondia*.It certainly does not seem like an introduction, and occurs associated with *Dondia* apparently all along the New Jersey coast marshes, although more extensive collections will be required to ascertain the relative abundance of these plants, which have not appealed very strongly to collectors in the past.*Fr.*—Early September to late October.*Maritime.*—Seaside Park, Ocean City, St. Albans (L), N. Beach Haven (L), Barnegat City (L), Waretown, Sea Isle City, Anglesea, Wildwood.

SALSOLA L.

Salsola kali L. Saltwort.

Pl. LVII., Fig. 2.

Salsola kali Linnæus, Sp. Pl. 222. 1753 [Europe].—Muhlenberg Cat. 29, 1813.
—Barton Fl. Phila. I. 150. 1818. Knieskern 26.—Willis 51.—Britton
208.—Keller and Brown 135.

Common in sands of the sea beaches. Reported “up the Delaware to Camden” in Britton’s Catalogue, but this statement is incorrect, as the occurrence at Camden was an introduction, no doubt, on ballast; the Atsion record in Willis’ list, if at all correct, is to be similarly explained. Some of our specimens are glabrous and may represent the so-called variety *caroliniana*, but the form does not seem to be worthy of recognition.

Fr.—Late September into November.

Maritime.—Sandy Hook, Long Branch, Waretown, Surf City (L), Holgate’s, (L), Absecon, Atlantic City, Brigantine, Cape May.

Family AMARANTHACEÆ. Amaranths.

Key to the Species.

- a. Flowers monocious or polygamous, all with a calyx.
 - b. Flowers in dense terminal spikes. [*A. retroflexus*]*
 - bb. Flowers in small axillary clusters, shorter than the leaves.
 - c. Low, fleshy seacoast plant, leaves often purplish.
A. pumilus, p. 433
 - cc. Bushy branched plants of field, and waste ground.
A. graecizans.]†
- aa. Flowers dioecious. Calyx wanting in the fertile flowers.
Acnida cannabina, p. 434

AMARANTHUS L.

Amaranthus pumilus Raf. Coast Amaranth.

Amaranthus pumilus Rafinesque, Med. Rep. (II.) 5. 360. 1808 [Island near Egg Harbor, N. J.].—Nuttall, Gen. II. 201. 1818.—Britton 205.—Keller and Brown 136.

* *A. retroflexus* Green Amaranth or Pigweed, is frequent about barn-yards and waste places, as is the closely allied *A. hybridus*.

† *A. graecizans* Tumbleweed, is a low plant of cultivated and waste ground; becoming detached in autumn it tumbles about over the ground before the wind like the panicles of old Witch Grass.

Sands of the sea beaches; apparently local and not common. Not reported from south of Sea Isle City in New Jersey.

Fr.—Early August into September.

Maritime.—Long Branch, Barnegat City (L), Long Beach Island on New Inlet (L), Tucker's (L), Brigantine, Atlantic City, Sea Isle City (P), Cape May Ct. House.

ACNIDA L.

Acnida cannabina L. Water Hemp.

Acnida cannabina Linnæus, Sp. Pl. 1027. 1753 [Virginia].—Barton Fl. Phila. II. 193. 1818.—Britton 205.—Keller and Brown 136.

Common along the coast marshes and up the Delaware at least as far as our limits.

Fl.—Mid-August to late September. *Fr.*—Late August to early October.

Middle District.—Kinkora (NY), Fish House, Kaighn's Pt., Camden, Washington Park, Salem (S), Millville.

Coast Strip.—Forked River, Barnegat Pier, Manahawkin, Harvey Cedars (L), Anglesea, Cold Spring (S), Cape May, Tuckahoe (S).

Cape May.—Dennisville (S).

Family PHYTOLACCACEÆ. Poke.

PHYTOLACCA L.

Phytolacca decandra L. Poke.

Phytolacca decandra Linnæus, Sp. Pl. Ed. 2. 631. 1762 [Virginia].—Knieskern 25.—Britton 208.

River shores and waste ground, especially in the Middle and Cape May districts; common also on the coastal islands. The Poke, while supposedly native of this region, has become such a thorough weed that all trace of its original habitat has been lost.

Fl.—Mid-June into autumn. *Fr.*—Mid-August into autumn. Flowering and fruiting continuously until cut down by frost.

Family AIZOACEÆ. Carpet weed, etc.

Key to the Species.

a. Fleshy seacoast herbs, leaves spatulate, opposite.

Sesuvium maritimum, p. 435

aa. Not fleshy, leaves mostly linear, verticillate.

[*Mollugo verticillata*]*

* Carpetweed, a common prostrate weed of cultivated grounds.

SESUVIUM L.

Sesuvium maritimum (Walt.). Sea Purslane.*Pharnacium maritimum* Walter, Fl. Car. 117. 1788 [South Carolina].*Sesuvium sessile* Nuttall Gen. I. 306. 1818.*Sesuvium portulacastrum* Knieskern 9.—Willis 13.*Sesuvium maritimum* Britton 112.—Keller and Brown 137.

Occasional on the sea beaches; not nearly as abundant in New Jersey as most statements would lead one to suppose.

Fl.—Early July into September. *Fr.*—Mid-July into October.

Maritime.—Deal, Halfway House south of Bond's (L), Sherburn's (L), Ocean City, Wildwood, Cape May (S).

Family PORTULACACEÆ. Purslane, etc.

Key to the Species.

- a.* Plant prostrate, flowers yellow. [Portulaca oleracea]*
aa. Plant erect, flowers white striped with pink. Claytonia, p. 435

CLAYTONIA L.

Claytonia virginica L. Spring Beauty.

Pl. LXXXIV., Fig. 2.

Claytonia virginica Linnæus, Sp. Pl. 204. 1753 [Virginia].—Knieskern 9.—Britton 66.

Common in moist woodland in the northern counties and less abundant and local southward in the Middle district.

Fl.—Early April to mid-May. *Fr.*—Early May to mid-June.

Middle District.—Keyport (C), New Egypt, Bordentown, Burlington (C), Kinkora, Fish House, Pensauken (S), Camden, Pemberton (NB), Moorestown (C), Haddonfield (C), Gloucester, Woodbury, Mickleton (NB), Marlboro (C), Alloway, Quinton, Salem (C), Swedesboro, Stoe Creek.

Family CARYOPHYLLACEÆ. Pinks, etc.

Key to the Species.

- a.* Sepals united into a cup-like or tubular calyx.
b. Calyx with two or more lance, awl-form bracts at its base, flowers pink. [Dianthus armeria]¹
bb. Calyx without bracts.
c. Five-toothed and ten-nerved.
d. Styles 5, flowers red-purple, 20–80 mm. broad. [Agrostemma githago]²

* Purslane, an abundant and familiar fleshy weed.

¹ Deptford Pink. Frequent weed in fields.

² Corn Cockle. A grain-field weed.

- dd. Styles 3, flowers white or pink.
- e. Calyx not inflated at flowering time.
- f. Plant pubescent and viscid; flowers large, white, blooming at night. [*Silene noctiflora*]³
- ff. Stem with a portion of each joint glutinous, otherwise nearly glabrous, flowers small, pink, blooming transiently in sunshine. *S. antirrhina*, p. 438
- fff. Plant more or less viscid—pubescent, flowers 20–30 mm. broad.
- g. 3–6 dm. high, flowers crimson. *S. virginica*, p. 437
- gg. 1–2.5 dm. high, flowers pink. *S. caroliniana*, p. 437
- cc. Calyx bladdery-inflated, flowers white.
- d. Petals fringed. *S. stellata*, p. 437
- dd. Petals, two-cleft. [*S. latifolia*]⁴
- cc. Obscurely-nerved, terete or five-angled, flowers white, tinged with pink. [*Saponaria officinalis*]⁵
- aa. Sepals distinct or nearly so, low herbs with white or red petals or none.
- b. Fruit a dehiscent capsule.
- c. Stipules present, flowers pink-red.
- d. Plants fleshy, stipules ovate or deltoid. *Tissa marina*, p. 442
- dd. Plants not fleshy, stipules lanceolate. [*Tissa rubra*]⁶
- cc. Stipules none.
- d. Plants fleshy, forming dense mats on the seashore. *Ammodenia*, p. 441
- dd. Plants not fleshy.
- e. Petals two-cleft.
- f. Cleft nearly to the base, styles 3.
- g. Stems and flower stalks glabrous.
- h. Petals shorter than the sepals. *Alsine uliginosa*, p. 438
- hh. Petals longer than the sepals. *A. longifolia*, p. 438
- gg. Stems and flower stalks pubescent. [*A. media*]⁷
- ff. Petals cut half-way, styles 5 or 4.
- g. Petals much longer than the sepals. *Cerastium arvense*, p. 439
- gg. Petals about equaling the sepals.
- h. Pedicels not longer than the sepals, flowers glomerate. [*C. viscosum*]⁸
- hh. Pedicels at length longer than the sepals, flowers cymose.
- i. Perennial, tufted. [*C. vulgatum*]⁹

³ Night-flowering Catchfly, occasional in waste ground.

⁴ Bladder Campion, occasional in waste ground.

⁵ Bouncing Bet. Very common roadside weed.

⁶ Purple Sand Spurry, a weed especially on the coast.

⁷ Common Chickweed. This and the next two familiar garden weeds.

⁸ Mouse-ear chickweed.

⁹ Larger Mouse-ear Chickweed.

ii. Annual, weak and reclining. *C. nutans*, p. 439

cc. Petals entire.

f. Styles as many as the sepals.

g. Ascending, seeds orange brown when mature, dotted with resinous atoms. *Sagina decumbens*, p. 439

gg. Depressed or spreading, seeds dark or grayish brown, not resinous. *S. procumbens*, p. 440

ff. Styles fewer than the sepals.

g. Leaves broad, 10–20 mm. long.

Moehringia lateriflora, p. 441

gg. Leaves ovate, very small, acute.

[*Arenaria serpyllifolia*]¹⁰

ggg. Leaves awl-shaped, closely imbricated.

A. caroliniana, p. 440

bb. Fruit an indehiscent or irregularly bursting utricle.

c. Stipules present.

d. Plant somewhat pubescent, short-jointed, low and spreading.

Anychia polygonoides, p. 442

dd. Smooth, longer jointed, slender and erect. *A. canadensis*, p. 442

cc. Stipules none, leaves awl-shaped, plant prostrate, spreading.

[*Scleranthus annuus*]¹¹

SILENE L.

Silene stellata (L.). **Starry Campion.***

Cucubalus stellatus Linnæus, Sp. Pl. 414. 1753 [Virginia and Canada].

Silene stellata Knieskern 9.—Willis 12.—Britton 60.

Common in woods of the northern counties and locally southward in the Middle districts and on the coast islands.

Fl.—Early July to early August.

Middle District.—Shark River (Kn), New Egypt, Birmingham, Pemberton Jnc. (S), Moorestown (C), Medford (S), Bordentown (C), Fish House, Camden (CP), bel. Washington Park (S), Swedesboro, Mickleton (H).

Coast Strip.—Anglesea, Wildwood (UP), Cold Spring.

Silene caroliniana Walt. **Sticky Catchfly. Wild Pink.**

Silene Caroliniana Walter Fl. Car. 142. 1788 [South Carolina].

Silene Pennsylvanica Barton, Fl. Phila. I. 211. 1818.—Knieskern 9.—Britton 61.

¹⁰ Thyme-leaved Sandwort. Frequent especially about yards and gardens.

¹¹ Knawel. Abundant in sandy waste ground.

* *Silene virginica* Linnæus, Sp. Pl. 419. 1753 [Virginia].—Willis 12.—Britton 61.—Keller and Brown 139.

This species is exceedingly rare in the State, if indeed it occurs at all. Willis publishes a record for Warren County on authority of F. Knighton, and one for "near Camden" on authority of W. M. Canby. I can find no trace of either specimen. Githens' record for Woodbury, published in Keller and Brown's list, is the following species.

Frequent in dry sandy soil in the upper part of the Middle district and on some of the coast islands. North of our limit in the State it occurs only in the Middle district, but grows locally beyond the fall line in Pennsylvania. This is a beautiful and characteristic West Jersey plant, easily recognized by its bright pink flowers, sticky pedicels and general rosette-like habit.

Fl.—Early May to mid-June.

Middle District.—New Egypt, Browns Mills, Birmingham, Pemberton (C), Evansville (C), Medford (S), Locust Grove (S), Beverly, Washington Park, Fancy Hill, Mantua (H), Camden (CP).

Coast Strip.—Piermont, Five-Mile Beach.

***Silene antirrhina* L. Sleepy Catchfly.**

Silene antirrhina Linnæus, Sp. Pl. 419. 1753 [Virginia and Carolina].—Barton Fl. Phila. I. 211. 1818.—Knieskern 9.—Britton 61.

Frequent in the Northern and Middle districts and occasional in the Pine Barrens.

It has become so much of a weed that its true distribution cannot now be determined.

Fl.—Late May to late June.

Middle District.—New Egypt, Beverly, Burlington, Red Bank, Sewell (S), Pitman, Swedesboro.

Pine Barrens.—Landisville (T), Mays Landing (NB), introduced, probably.

Coast Strip.—Cedar Bonnet (L).

ALSINE L.

***Alsine uliginosa* (Murr.). Marsh Chickweed.**

Stellaria uliginosa Murray, Prodr. Goett. 55. 1770 [Vicin. Goettengen].—Britton 63.

In springs and small brooks at several stations in the northern counties and rarely southward, entering our area along the Delaware River.

Fl.—Early May to early September.

Middle District.—Delanco, Riverton (C), [Dr. Jos. Stokes, 1882].

***Alsine longifolia* (Muhl.). Long-leaved Chickweed.**

Stellaria longifolia Muhlenberg, in Willd. Enum. Hort. Ber. 479. 1809 [Pennsylvania].—Britton 63.

Common in swamps and meadows of the northern counties, and south locally in the Middle district.

Fl.—Mid-May to mid-June.

Middle District.—New Egypt, Delair, Pemberton (C), Medford (S), Lindenwold (S), Atco (C), Pitman, Grenloch, Mickleton (H), Swedesboro.

CERASTIUM L.*

Cerastium arvense L. Field Chickweed.

Cerastium arvense Linnæus, Sp. Pl. 438. 1753 [Scania and So. Europe].—Britton 62.

Frequent in rocky places in the northern counties and occasional on sandy banks in the upper part of the Middle district. It was also collected once at Cape May Court House, but it was probably introduced there.

Fl.—Late April to early June.

Middle District.—Bordentown (C), Fancy Hill, Kaighns Pt., Camden, Gloucester, Westfield, Red Bank (C).

SAGINA L.

Sagina decumbens (Ell.). Decumbent Pearlwort.

Spergula decumbens Elliott, Bot. S. C. and Ga. I. 523. 1817 [South Carolina].

Sagina decumbens Britton 65.—Keller and Brown 142.

Spergula saginoides Barton, Fl. Phila. I. 214. 1818.—Nuttall Gen. I. 290. 1818.

Sagina subulata var. *Smithii* Gray, Man. Ed. V. 95. 1867 [Somers Pt. N. J.].

—Willis 12.

Sagina decumbens var. *Smithii* Britton 65.—Keller and Brown 142.

Damp sandy places in the Coast strip, frequent; less common in the Middle district, also at one station in Passaic Co.

The plant known as *Sagina decumbens* var. *smithii* seems to be nothing more than an apetalous form of this and not worthy of even varietal recognition, as similar apetalous forms occur in several other genera of the *Caryophyllacea*. It was originally discovered at Somers Point, N. J., by Mr. Charles E. Smith, of Philadelphia, after whom it was named.

Fl.—Late April to late June.

Middle District.—Delair, Haddonfield, Westville (KB), Gloucester (NB), Game Creek, Salem Co.

* *Cerastium nutans* Rafinesque, Préc. Découv. 36. 1814 [Pennsylvania].—Knieskern 9.—Britton 63.

Frequent in woods of the northern counties, but very rare within our limits, if it occurs at all. Knieskern stated that it occurred in Monmouth County and in Britton's Catalogue, it is reported from Camden on authority of Miss C. A. Boice. I have seen no specimens from our region.

Coast Strip.—Deal, Pt. Pleasant, Surf City (L), Beach Haven (L), Spray Beach (L), Atlantic City, Somers Pt., Mays Landing (NB), Wildwood, Cape May (S), Avalon, Pleasant Mills, Stone Harbor.*

Pine Barrens?—Egg Harbor City (H).

Sagina procumbens L. Procumbent Pearlwort.

Sagina procumbens Linnæus, Sp. Pl. 128. 1753 [Europe].—Britton 65.—Keller and Brown 142.

Occasional in the northern counties and on the upper Coast strip. Also as an introduced weed in city streets.

Fl.—Early May to late June.

Coast Strip.—Pt. Pleasant, Deal, Beach Haven Terrace (L).

ARENARIA L.

***Arenaria caroliniana* Walt. Pine Barren Sandwort.**

Pl. LVIII., Fig. 1.

Arenaria caroliniana Walter, Fl. Car. 141. 1788 [South Carolina].—Britton 64.—Keller and Brown 142.

Arenaria squarrosa Pursh Fl. Am. Sept. I. 318. 1814.—Willis 12.

Alsine squarrosa, Knieskern 9.

Frequent in white sand in the Pine Barrens, but not found elsewhere in the State nor anywhere farther north, except on Staten or Long Islands.

This little plant, the "Longroot" of the natives, is characteristic of the barest patches of white sand, of which, except for a few grasses, it is often the sole occupant. At other times it is associated with *Linaria canadensis* and *Chrysopsis falcata* and species of *Lechea*. The little awl-shaped leaves form dense tufted rosettes, resembling some species of moss, and from these the slender branching flower stalks stand up to a height of two or three inches. The white flowers, with their greenish centers, are very delicate and attractive, but difficult to distinguish against the white sand. The stalks are somewhat glandular and sand grains and the ever-present mosquitoes are sometimes found adhering to them.

Fl.—Early June to late July, and occasionally through the summer.

* Also reported in Keller and Brown's list from Hammonton, but I have been unable to verify the record.

Pine Barrens.—Toms River, Browns Mills, Hanover, Brindletown, Double Trouble, Jones Mill (S), Speedwell, White Horse (S), Atsion, Ballenger's Mills, Taunton, Quaker Bridge, Head of Batsto (S), Pleasant Mills, Batsto, Williamstown Jnc., Winslow, Inskip, Folsom, Mays Landing.

MOEHRINGIA L.

Moehringia lateriflora (L.). Blunt-leaved Sandwort.

Arenaria lateriflora Linnæus, Sp. Pl. 423. 1753 [Siberia].—Britton 64.
Moehringia lateriflora Keller and Brown 142.

In low woods and meadows; occasional in the northern counties and along the Coastal strip, also rarely in the Middle district. First detected within our limits by Mr. C. F. Parker in the woods below Atlantic City.

Fl.—Late May to late June.

Middle District.—Farmingdale, Lindenwold.

Coast Strip.—Atlantic City, Longport (S), Anglesea.

AMMODENIA J. G. Gmelin.

Ammodenia peploides maritima Raf. Sea-beach Sandwort.

Pl. V., Fig. 1. Pl. LV., Fig. 2.

Adenarium maritimum Rafinesque, New Flora Pt. I. 62. 1836 [New England to New Jersey].

Arenaria peploides.—Willis 12.—Britton 64.

Honkenya peploides.—Knieskern 9.

Ammodenia peploides Keller and Brown 143.

Sea beaches above high tide all along the coast. Apparently much less common than formerly, and extinct in the vicinity of many of the most populous resorts. The large tufts or cushions, and the sand which they collect, form conspicuous objects along the beach. Prof. Fernald has shown that our plant is different from the more northern form, but if we recognize the genus *Ammodenia* as separable from *Arenaria*, which he does not do, we must use Rafinesque's name, *maritima*, for the southern form.

Fl.—Early May to early June.

Maritime.—Sandy Hook, Asbury Park, Deal, Mantoloking (McK), Pt. Pleasant, Manasquan, Barnegat City (L), Tucker's (L), Spray Beach (L), St. Albans (L), Ship Bottom (L), Atlantic City, Ocean City, Stone Harbor, Anglesea, Cape May (S).

TISSA Adanson.

Tissa marina (L.). Salt Marsh Sand Spurry.

Arenaria rubra var. *marina* Linnæus, Sp. Pl. 423. 1753 [Shores of the ocean].

Spergularia rubra var. *marina* Knieskern 9.—Willis 13.

Tissa marina Britton 65.—Keller and Brown 143.

Sandy spots in the salt marshes of the coast; frequent.

Prof. Fernald and Mr. K. M. Wiegand propose to reject Linnaeus' name *marina* as non-identifiable and to substitute *leiosperma*. Every effort, however, should be made to fix the older name, admittedly composite, to one of its components, in preference to rejecting it. (cf. *Rhodora*, 1910, p. 157.)

Fl.—Early June into September. *Fr.*—Late June into autumn.

Maritime.—Sandy Hook, Sea Girt, Long Branch, St. Albans (L), Brigantine, Atlantic City, Ocean City, Sea Isle City, Anglesea, Holly Beach, Cold Spring, Cape May.

ANYCHIA Michaux.

Anychia canadensis (L.). Slender Forked Chickweed.

Anychia canadensis Linnæus, Sp. Pl. 90. 1753 [Canada and Virginia].—Britton 204.—Keller and Brown 143.

Frequent in open woods in the northern counties, and less common southward in the Middle district.

Fl.—Mid-June into September.

Middle District.—Pemberton Jnc., Medford (S), Oaklyn (S), Red Bank, Swedesboro.

Pine Barrens?—Mays Landing (NB).

Anychia polygonoides Raf. Forked Chickweed.

Anychia polygonoides Rafinesque, Atl. Jour. 1832. 16 [Alleghany Mts.].

Anychia dichotoma Knieskern 9.—Britton 204.—Keller and Brown 143.

Frequent in the northern counties in shady localities, rare in our region, but occurs both in the Pine Barrens and Middle district.

Fl.—Late June into October.

Middle District.—Marlboro (NB).

Pine Barrens.—Ancora, Waterford.

Order RANALES.

Family NYMPHÆACEÆ. Water-Lilies.

Key to the Species.

- a. Leaves peltate.
 - b. Flowers purple, 10-16 mm. in diameter, sepals and petals three.
Brasenia purpurea, p. 443
 - bb. Flowers yellow, 120-250 mm. in diameter, sepals 4-5, petals numerous.
Nelumbo lutea, p. 446
- aa. Leaves orbicular to oblong.
 - b. Flowers white or tinged with pink, stamens yellow.
Castalia odorata, p. 445
 - bb. Flowers yellow.
 - c. Leaves smaller, floating, sinus closed, petiole flattened.
Nymphaea variegata, p. 444
 - cc. Leaves larger, erect, sinus open, petiole nearly terete.
Nymphaea advena, p. 444

BRASENIA Schreber.

Brasenia purpurea (Michx.). Water Shield.

Hydropeltis purpurea Michaux, Fl. Bor. Am. I. 324, pl. 29. 1803 [Lower Carolina and Tennessee].

Brasenia peltata Pursh, Fl. Am. Sept. II. 389. 1814 [New Jersey to Carolina].—Knieskern 6.—Willis 5.—Britton 43.

Rather frequent in lakes and ponds of the northern counties and in ponds and dammed streams in the Pine Barrens and Cape May district; apparently rare in the Middle district.

A very characteristic species of the old milldams in the Pine Barrens, though its smaller peltate leaves and little maroon colored flowers are not nearly so conspicuous as the showy blooms and large leaves of the true Water Lilies. The petioles and buds are encased in a thick coating of jelly-like mucilage.

Fl.—Early June to early August. *Fr.*—Early July to early September, probably.

Middle District.—Delanco (S), Shark River (Kn), Meteticunk River (NY), Barrsville (Kn), Spring Garden (Willis).

Pine Barrens.—Toms River, Forked River, Jackson, Atco, Atsion, Pancoast, Hammonton (Bassett.).

Cape May.—Nummeytown (S), Cold Spring (OHB).

NYMPHÆA L.

Nymphæa advena Soland. Upright Spatter-dock.

Nymphæa advena Solander, in Ait. Hort. Kew. II. 226. 1789 [North America].—Knieskern 6.—Britton 44.—Keller and Brown 144.
Nuphar advena Barton Fl. Phila. II. 10. 1818.

Common along the lower Delaware River and adjacent ditches and tidewater streams of West Jersey.

This is the large-leaved erect Spatterdock so common along the Delaware meadows, where it grows in association with *Sagittaria latifolia*, *Peltandra virginica*, *Zizania*, etc.

Fl.—Mid-May to mid-September.

Middle District.—Riverside, Pensauken, Washington Park, Haddonfield (S).

Nymphæa variegata Engelm. Floating Spatter-dock.*

Nymphæa variegata Engelmann, Gray's Man. Ed. V., p. 57. 1867 [Probably Michigan].—Keller and Brown 145.
Nymphæa microphylla Britton 44 (in part).

Ponds and slow streams in the northern counties and the Pine Barrens, apparently scarce in the Middle district.

This is the Floating Spatterdock with smaller leaves and rounder lobes, and weaker petioles.

It seems to be the only species in the higher Alleghenies of Pennsylvania and reappears as a characteristic plant of the New Jersey Pine Barrens. Specimens from this region that have been referred to *N. rubrodiscum* are apparently all referable to this species, and so far as I can see those referred to *N. microphylla* Pers. fall into the same category. Specimens from Pensauken Creek have thin submerged leaves and small flowers, but they are connected with *N. variegata* by a full series of intermediates. Whatever true *N. microphylla* may be I can see no more difference in the extremes of these floating Spatter-docks in southern New Jersey than exists in the White Water Lilies.

Fl.—Probably similar to the last.

* Cf. G. S. Miller, Jr., Proc. Biol. Soc. Wash. 1902, pp. 11-13.

Middle District.—Pensauken (S), Burlington.

Pine Barrens.—Farmingdale (S), Allaire (S), Forked River, Ballinger's Mill, Sicklerville, Clementon, Folsom, Hammonton, Batsto, Mays Landing, Dennisville.

CASTALIA Salisbury.

Castalia odorata (Dryand). Water Lily.

Pl. LIX.

Nymphaea odorata Dryand, in Ait. Hort. Kew II. 227. 1789 [North America].—Barton Fl. Phila. I. 12. 1818.—Knieskern 6.

Castalia odorata Britton 43.—Keller and Brown 145.

Nymphaea odorata var. *minor* Willis 5.

Castalia odorata var. *minor* and forma *rosea* Britton 43.

Castalia odorata rosea Keller and Brown 145.

Common throughout the State in ponds and dams. Especially plentiful in the Pine Barrens, where the majority of the plants have smaller leaves and often smaller flowers representing the so-called variety *minor*. Sometimes the pink color, which is usually apparent on the back of the petals, suffuses the whole flower to a greater or less degree, and this represents the form *rosea*, which is recognized by some authors. Fine examples of these pink flowers were observed by I. H. Hall, July 4, 1865, near Atsion,* and the late Mr. Albrecht Jahn collected some at Hanover, Burlington Co., which are in the herbarium of the Philadelphia Academy. The original water lily that formed the basis of Dryand's description was received from Mr. William Hamilton of the "Woodlands," Philadelphia, and quite likely came from the New Jersey side of the Delaware, as the plant was always more common there than on the Pennsylvania side.

Fl.—Early June to late September.

Middle District.—New Egypt, Florence, Burlington, Delanco, Paulsboro, Mickleton, Swedesboro, Centerton (S), Woodstown (C).

Pine Barrens.—Asbury Park, Allaire, Toms River (S), Forked River, Manchester, Hanover (C), Bamber, Dover Forge, Island Heights, Speedwell, Cedar Brook, Winslow (S), Folsom, Pancoast, Hammonton, Pleasant Mills (NB), Mays Landing (T).

Cape May.—Nummeytown, Cold Spring, Cape May (NB).

* cf. Bull. Torrey Bot. Club, IV. 8:1873.

NELUMBO Adanson.

Nelumbo lutea (Willd.). American Lotus.

Nelumbium luteum Willdenow, Sp. Pl. II. 1259. 1799 [Virginia, Carolina and Florida].—Willis 5.—Britton 43.—Keller and Brown 145.

Very local, but abundant where found, *i. e.*, at Swartsword Lake, Sussex Co., and in pounds at Woodstown and Sharptown, Salem Co.*

Fl.—Late July to late August or into September.

Middle District.—Woodstown, Sharpstown.

Family CERATOPHYLLACEÆ. Hornwort.

CERATOPHYLLUM L.

Ceratophyllum demersum L. Hornwort.

Ceratophyllum demersum Linnæus, Sp. Pl. 992. 1753 [Europe].—Britton 228.—Keller and Brown 145.

Ponds and slow streams in the Middle and Cape May districts, and at several stations north of our limits, but apparently all in the Coastal plain.

Mr. Bayard Long tells me that he thinks our local material represents two forms, probably *C. demersum* and *C. echinatum*, but that the character of foliage and spines on the fruit do not seem sufficiently constant to warrant recognition.

Fr.—August 12, 1910, Cape May, mature.

Middle District.—Fish House, Cooper's Creek, Camden (P), Repaupo (H), Mickleton (H), Swedesboro, Mullica Hill (H).

Cape May.—Bayside (OHB), Cape May.

Family MAGNOLIACEÆ. Magnolias.

Key to the Species.

- a.* Flowers white. Leaves entire. *Magnolia virginiana*, p. 446
aa. Flowers green and orange. Leaves truncate, lobed. *Liriodendron tulipifera*, p. 448

MAGNOLIA L.

Magnolia virginiana L. Sweet Bay, Swamp Magnolia.

Pl. LX.

Magnolia virginiana Linnæus, Sp. Pl. 535. 1753 [Virginia and Carolina].—Keller and Brown 146.

Magnolia glauca Michaux, Fl. Bor. Am. I. 327. 1803.—Pursh, Fl. Am. Sept. II. 380. 1814.—Barton Fl. Phila. II. 18. 1818.—Knieskern 6.—Willis 4.—Britton 41.

* cf. Heritage Bull. Torr. Bot. Club, XXII., pp. 266–271, for a study of the plant at Sharptown.

Common in swampy thickets throughout our region and at a number of stations north of our limits, but south of the fall line.

This is a characteristic tree of the coastal plain most abundant and uniformly distributed in the Pine Barrens, but frequent in the other districts also. Unlike most of the cultivated magnolias, it is a late bloomer, the flowers appearing in June when the leaves are fully developed. At that season the atmosphere of the Pine Barren swamps is heavy with the perfume of the Magnolia, and we recognize its presence long before we detect the creamy cup-shaped flowers nestling among the shining green leaves. As the wind stirs the foliage, the glaucous under surfaces are turned up and show conspicuously against the general green tone of the swamp vegetation, and later on the bright red seeds bursting forth from the cone-like receptacle, or hanging from it by slender threads, make the Magnolia equally conspicuous.

Unfortunately Magnolia flowers have a market value, and the curbstome flower-venders of Philadelphia ruthlessly strip them from the trees, often breaking the latter to such an extent as to permanently ruin them. To become saleable it seems that the leaves must be plucked off and the flowers tied closely together in a compact mass, some of the leaves being then fastened around the outside in a sort of a halo, this "artistic" arrangement proving more satisfactory to both buyer and seller than that which nature found desirable. A similar arrangement is seen in the bunches of *Arbutus* offered for sale earlier in the season, some of which are further embellished with a head of *Helonias* as a centerpiece.*

Fl.—Late May to early July. *Fr.*—Early August into October.

Middle District.—Shark River, Farmingdale, Bordentown, Medford (S), Washington Park, Dividing Creek.

Pine Barrens.—Allaire, Forked River, Browns Mills, Bamber, Speedwell, Bear Swamp (S), Clementon, Penbryn (S), Albion, Williamstown, Cedar Brook, Andrews, Landisville, Hammonton, Egg Harbor.

* Mr. Samuel N. Rhoads informs me that some years ago he found two trees of *Magnolia tripetala* about eight feet in height, one in thick woods north of Orchard Sta., the other near Audubon. Mr. Bayard Long found another near Bordentown in 1910. If these trees are native, as seems probable, they furnish another instance of a southern species, common to the Susquehanna and Delaware valleys.

Coast Strip.—Surf City (L), Beesley's Pt. (S), Palermo (S), Piermont (S), Anglesea (UP).

Cape May.—Court House.

LIRIODENDRON L.

Liriodendron tulipifera L. Tulip-tree. Tulip Poplar.

Pl. LXI., Fig. 1.

Liriodendron tulipifera Linnæus, Sp. Pl. 535. 1753 [North America].—

Knieskern 6.—Willis 4.—Britton 41.

A common tree in rich woodland of the Northern and Middle districts and occasional in the Cape May peninsula and Coast strip.

The term "poplar," for this tree is one of those unfortunate misnomers which it seems impossible to dispose of. It, of course, has nothing to do with the true Poplars. (*Populus*, p. 391.)

Fl.—Late May to early June. *Fr.*—Early September, through autumn. The axes of the cones, often with numerous carpels attached, commonly persist over winter.

Middle District.—New Egypt, Birmingham, Medford (S), Haddonfield, Lawnside (S), Glassboro, Sewell (S), Sicklerville (S), Albion.

Coast Strip.—Manahawkin, Barnegat.

Cape May.—Goshen (S), Sluice Creek (S), Court House, Cold Spring.

Family ANNONACEÆ. Pawpaws.

ASIMINA Adanson.

Asimina triloba (L.). Papaw.

Annona triloba Linnæus, Sp. Pl. 537. 1753 [Carolina].

Asimina triloba Britton 41.—Keller and Brown 146.

A southern species, apparently very rare in the State. The only records are those given in Britton's Catalogue: "Abundant along Crosswicks Creek, Mercer Co. (C. C. Abbott); Ridge's Island, Delaware River, Hunterdon Co. (Best); Thompsonstown, near Mays Landing, Atlantic Co. (Bassett)."

I have been unable to find any specimens from the State or to see the tree growing.

Family RANUNCULACEÆ. Buttercups, etc.

Key to the Species.

a. Fruit consisting of heads of dry follicles.

b. Leaves reniform, basal, flowers of yellow, petal-like sepals.

Caltha palustris, p. 450

bb. Leaves large, ternately compound; flowers white in a slender, erect raceme.

Cimicifuga racemosa, p. 451

- bbb.* Leaves ternately compound, flowers red and yellow pendant, with long spurs. *Aquilegia canadensis*, p. 452
- aa.* Fruit consisting of berries, leaves ternately compound, flowers white, in an erect raceme.
- b.* Berries white, pedicels red. *Actaea alba*, p. 451
- bb.* Berries red. *Actaea rubra*, p. 451
- aaa.* Fruit consisting of cluster of achenes.
- b.* Stem-leaves forming an involucre below the calyx: as the sepals are blue or white, they could easily be taken for petals (which are lacking) and the green bracts for sepals.
- c.* Involucre remote from the white flower (tinged with pink or green externally).
- d.* Achenes densely wooly, flowers white, plant 6-10 dm. high. *A. virginiana*, p. 452
- dd.* Achenes pubescent or nearly glabrous.
- e.* Plant 3-6 dm. high, involucre leaves sessile. *A. canadensis*, p. 452
- ee.* Plant 1-2 dm. high, involucre leaves, lobed, petioled. *A. quinquefolia*, p. 453
- cc.* Involucre of three simple leaves close to the flower. *Hepatica hepatica*, p. 453
- ccc.* Involucre of three compound sessile leaves. *Syndesmon. thalictroides*, p. 454
- bb.* No involucre leaves.
- c.* Leaves opposite, plant a climbing vine, flowers white, sepals petal-like, petals wanting. *Clematis virginiana*, p. 454
- cc.* Leaves alternate or basal, not climbing vines.
- d.* Petals present.
- e.* Achenes compressed, flowers yellow.
- f.* Aquatic plant with finely divided floating leaves. *R. delphinifolius*, p. 454
- ff.* Plants of swamps or muddy shores, leaves entire or denticulate.
- g.* Plant low, 1.5-3 dm. high, petals barely exceeding the sepals, stamens 1-10. *R. pusillus*, p. 455
- gg.* Plant taller, 3-10 dm. high, petals longer than sepals, stamens numerous. *R. obtusiusculus*, p. 455
- fff.* Leaves, some or all, lobed or divided, terrestrial species or growing upright in shallow water.
- g.* Some of the basal leaves merely crenate. *R. abortivus*, p. 455
- gg.* Leaves all lobed or divided.
- h.* Flowers small, pale, less than 12 mm. broad, petals rarely exceeding the sepals.
- i.* Plant glabrous. *R. scleratus*, p. 456
- ii.* Plants hirsute.
- j.* Head of fruit globose, beak of achene hooked. *R. recurvatus*, p. 456

- jj.* Head of fruit elongate, beak of achene straight. *R. pennsylvanicus*, p. 456
hh. Flowers large and showy, 15–30 mm. broad.
i. Beak of achene short, plants of fields, roadsides and waste ground.
j. Root fibrous, calyx spreading.
[*R. acris*]*
jj. Stem bulbous at base, calyx reflexed.
[*R. bulbosus*]†
ii. Beak of achene long, plants of woods or swamps.
j. Beak stout, later branches prostrate, rooting at the nodes, shaded damp ground. *R. septentrionalis*, p. 456
jj. Beak slender, plants upright, in woodlands. *R. hispidus*, p. 457
ee. Achenes transversely wrinkled, flowers white, plants floating in water, leaves finely divided.
Batrachium trichophyllum, p. 457
eee. Achenes compressed and longitudinally ribbed, plants low, glabrous (4–20 cm.) spreading by runners, flowers small yellow.
Oxygraphis cymbalaria, p. 457
dd. Petals none, flowers forming large, feathery, open panicles, greenish or white.
e. Filaments of the stamens club-shaped, plant not glandular.
ee. Filaments capillary. *T. polygamum*, p. 458
f. Plants low, 3–6 dm., flowers dioecious greenish, leaves thin. *T. dioicum*, p. 458
ff. Plants tall, 10–20 dm., flowers polygamous, white, leaves thick and glandular or waxy.
T. revolutum, p. 458

CALTHA L.

Caltha palustris L. Marsh Marigold.

Caltha palustris Linnæus, Sp. Pl. 558. 1753 [Europe].—Barton, Fl. Phila. II. 216. 1818.—Willis 3.—Britton 38.—Keller and Brown 147.

Common in swamps in the northern counties and less abundant locally southward in the Middle district.

Fl.—Early April to early May. *Fr.*—Late May to late June.

Middle District.—Freehold (C), Keyport, Perrineville (C), Farmingdale, New Egypt, Bordentown (C), Pensauken, Medford (S), Cooper's Creek, Camden (Bassett), Kaighns Pt., Lindenwold, Mantua, Mickleton, Mannington (C), Swedesboro.

* Tall Buttercup. The common roadside species in the northern part of the State, not common in our region.

† Bulbous Buttercup. The common Buttercup of fields and meadows, an abundant weed.

ACTÆA L.

Actæa rubra (Ait.). Red Baneberry.

Actæa spicata var. *rubra* Aiton, Hort. Kew. II. 221. 1789 [North America].
—Britton 40.—Willis 3.

Actæa rubra Keller and Brown 148.

Occasional in woods of the northern counties, its occurrence within our limits resting entirely upon two records published in Britton's Catalogue for Keyport and Cream Ridge, Monmouth County.

Actæa alba (L.). White Baneberry.

Actæa spicata var. *alba* Linnæus, Sp. Pl. 504. 1753 [America].

Actæa alba Britton 40.

Frequent in woods of the northern counties, but rare within our limits and confined to the Middle district.

Fl.—Mid-May to early June. *Fr.*—Late July into September.

Middle District.—New Egypt, Two miles west Mullica Hill (NB) [= 5 mi. S. Mickleton in A. N. S.], Blackwood, Clarksboro (C), Swedesboro.

CIMICIFUGA L.

Cimicifuga racemosa (L.). Black Snakeroot.

Actæa racemosa Linnæus, Sp. Pl. 504. 1753 [Florida, Virginia and Canada].

Frequent in rich woods of the Northern district, but rare within our limits and confined to the Middle district, except one station on the Cape May peninsula.

This is one of the familiar species in Pennsylvania just beyond the fall line, and in New Jersey just north of our boundary, but it is almost unknown within our limits. Martindale's statement, quoted by Britton, that it is "frequent in Camden County" is surrely incorrect. If it occurs at all, it is very rare. There is no specimen in his herbarium. In view of its great rarity, its occurrence in the lower Cape May peninsula, along with other species of similar distribution, is particularly interesting.

Fl.—Late June to mid-July. *Fr.*—September into October.

Middle District.—Bordentown (C), Camden Co. (C), Swedesboro.

Cape May.—Cold Spring (OHB).

AQUILEGIA L.***Aquilegia canadensis* L. Wild Columbine.**

Pl. LXII., Fig. 2.

Aquilegia canadensis Linnæus, Sp. Pl. 533. 1753 [Virginia and Canada].—Knieskern 6.—Willis 4.—Britton 39.

Aquilegia canadensis forma *flaviflora* Britton 39.

Frequent on rocky banks throughout the northern counties and southward locally through the Middle and Coast districts to the Cape May peninsula.

The Columbine in our region, failing to find its accustomed rocky banks, often grows out in flat sandy ground, especially on the coast islands, and becomes a larger, much more robust plant, sometimes three feet in height; quite different in appearance from the delicate plant of the northern counties.

At Sea Bright (Britton) and Cold Spring (O.H.B.) a form with pure yellow flowers occurs.

Fl.—Late April to early June. *Fr.*—Early June to mid-July.

Middle District.—Freehold (C), Keyport (C), Sea Bright (NB), Squan (Kn), Pemberton (NB), Birmingham, Vincentown (C), Bordentown, Medford (S), Little Timber Creek (CP), Mantua, Bridgeport (C), Raccoon Creek (H), Swedesboro, Courses Landing.

Coast Strip.—Atlantic City (P), Stone Harbor, Five-Mile Beach, Cold Spring.

ANEMONE L.***Anemone virginiana* L. Tall Anemone.**

Anemone virginiana Linnæus, Sp. Pl. 540. 1753 [Virginia].—Knieskern, 5.—Willis 1.—Britton 33.

Common in open woods of the northern counties; rare and local southward in the Middle district, recurring in the southern part of the Cape May peninsula.

Fl.—Early June to early August. *Fr.*—Late July to early September.

Middle District.—New Egypt, Middletown (Kn), Pemberton Inc. (S), Camden Co. (P), Mickleton, Mullica Hill (P).

Cape May.—Cold Spring, Bennett (S).

***Anemone canadensis* L. Canada Anemone.**

Anemone canadensis Linnæus, Syst. Nat. Ed. XIII. 3, App. 231. 1768 [Pennsylvania].—Keller and Brown 149.

Anemone dichotoma Britton 34.

Very rare and local. Known from several stations north of our limits and from Red Bank, Gloucester County, where it was collected by Charles F. Parker. Mr. Parker's specimens at Princeton and New Brunswick have been examined.

Middle District.—Red Bank (NB and P).

Anemone quinquefolia L. Wind Flower, Wood Anemone.

Anemone quinquefolia Linnæus, Sp. Pl. 541. 1753 [Virginia and Canada].

Anemone nemorosa Knieskern 5.—Britton 34.

Common in woods of the northern counties and not infrequent in the Middle district and along the Coast strip, though rather local; recurs in the lower part of the Cape May peninsula.

One feature in the flora of southern New Jersey which is particularly noticeable to one who is familiar with the country above the fall line is the almost total absence of the familiar spring flowers. When our upland woods are gay with Hepaticas, Bloodroots, Rue Anemones, Wood Anemones, Erythroniums and Spring Beauties, we find only one species—the Wood Anemone—at all generally distributed on the coastal plain, and it is not abundant, and practically absent from the Pine Barrens. The others rarely enter the region and are everywhere rare, and are mainly restricted to the vicinity of the Delaware River in Burlington County.

Fl.—Early April to mid-May. *Fr.*—Early May to mid-June.

Middle District.—Shark River, Farmingdale, New Egypt, Merchantville, Camden (P), Bordentown, Kinkora, Medford, Edge of Bear Swamp (S), Chairville, Browns Mills, Mantua, Sewell (S), Gloucester, Glassboro, Mickleton, Swedesboro, Yorktown, Quinton, Bridgeton.

Pine Barrens?—Landisville, Hammonton (Bassett) [both probably from edge of region].

Coast Strip.—Staffordsville (S), Palermo.

Cape May.—Cold Spring (OHB).

HEPATICA Scopoli.

Hepatica hepatica (L.). Liverwort.

Anemone Hepatica Linnæus, Sp. Pl. 538. 1753 [Europe].—Britton 34.

Common in woods of the northern counties; rare and local southward in the upper Middle district, many of the records being single plants or small colonies.

Fl.—Late March to late April. *Fr.*—Early May to early June.

454 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—Pt. Pleasant (C), New Egypt, Bordentown, Birmingham, Pemberton (NB), Pensauken (S), Haddonfield (C), Woodbury (C), Little Timber Creek (P), five mi. S. Mickleton, Mannington.

SYNDESMON Hoffmannsegg.

Synthesmon thalictroides (L.). Rue Anemone.

Anemone Thalictroides Linnæus, Sp. Pl. 542. 1753 [Virginia and Canada].

Thalictrum anemonoides Knieskern 5.

Anemonella thalictroides Britton 34.

Common in woods of the northern counties, becoming scarce and local southward in the Middle district.

Fl.—Mid-April to mid-May. *Fr.*—Mid-May to mid-June.

Middle District.—New Egypt, Kinkora, Camden (CP), Moorestown (C), Gloucester, Sewell (S), Swedesboro, Quinton, Marlboro (C), Bridgeton (NB). Also a record for "Mays Landing, Dr. Peters," quoted in Britton's catalogue, probably from the edge of the river below the dam in the inward extension of the coast strip. Several other Middle District plants occur here which are not known on the coast strip proper, and are completely cut off from their range to the west by the Pine Barrens (c. f. *Pinus virginiana*).

CLEMATIS L.*

Clematis virginiana L. Virgin's Bower.

Clematis virginiana Linnæus, Amoen. Acad. IV. 275. 1759 [Pennsylvania].

—Knieskern 5. Britton 33.

Thickets along streams; common in the northern counties and less commonly southward in the Middle district to Cape May.

Fl.—Late July to late August. *Fr.*—Early September to early October.

Middle District.—Shark River (Kn), Squan (Kn), Pt. Pleasant (S), New Egypt, Birmingham, Pemberton (C), Cookstown (C), Wrightstown (C), Medford (S), Camden (P), Mantua, Mullica Hill (C), Mickleton (NY), Washington Park, Kirkwood (C), Swedesboro, Salem (C).

Cape May.—New England (OHB).

RANUNCULUS L.

Ranunculus delphinifolius Torr. Yellow Water Crowfoot.

Ranunculus delphinifolius Torrey, in Eaton's Man. Ed. II. 395. 1818 [Upper Louisiana].—Keller and Brown 151.

Ranunculus multifidus Britton 36.

* *Atragene* is reported in Keller and Brown's list from "Pt. Pleasant," on authority of Dr. J. Stokes. Dr. Stokes, however, informs me that Pt. Pleasant, Pa., was intended, the plant growing on the New Jersey side of the Delaware.

Lakes or ponds at several stations in the northern counties, and reported from Freehold, Monmouth County, by Rev. Samuel Lockwood in Britton's Catalogue.

Ranunculus pusillus Poir. Low Crowfoot.

Ranunculus pusillus Poir, in Lam. Encycl. VI. 99. 1804 [Carolina].—Britton 36.—Keller and Brown 151.

Moist ground, rare. Several stations north of our limits, mostly in the Middle district, and several others in West Jersey.

Middle District.—Moorestown (NB), Taunton (C), Camden (P).

Ranunculus obtusiusculus Raf. Water-plantain Crowfoot.

Ranunculus obtusiusculus Rafinesque, Med. Rep. II. 5. 359. 1808 [New Jersey].—Keller and Brown 151.

Ranunculus ambiguus Britton 36.

Muddy banks of streams, etc.; at several stations in the northern counties and along the Delaware River from Trenton to Salem County. Mainly on the coastal plain.

Fl.—Late June to late July. *Fr.*—Early July to mid-August.

Middle District.—Florence (S), Camden, Washington Park (KB), West-Ville, Berkeley (NB), Repaupo (KB), Mantua Creek (KB), Gloucester (KB), Mickleton, Swedesboro.

Ranunculus abortivus L. Kidney-leaved Crowfoot.

Pl. LXII., Fig. 1.

Ranunculus abortivus Linnæus, Sp. Pl. 551. 1753 [Virginia and Canada].—Knieskern 5.—Britton 36.

Common in woods of the Northern and upper Middle districts; less abundant southward.

The crowfoots are not characteristic plants of the coastal plain and are mainly confined to the northern and western parts of the Middle district. The present species, *R. recurvatus* and *R. hispidus* are the most generally distributed.

Fl.—Mid-April to late May. *Fr.*—Early May to mid-June.

Middle District.—Farmingdale, New Egypt, Bordentown, Kinkora, Delaire, Delanco, Pensauken (S), Medford (S), Haddonfield, Camden (Bassett), Washington Park, Westville, Woodbury, Mickleton, Swedesboro, Marlboro (C), Riddleton, Quinton, Alloway.

Ranunculus sceleratus L. Celery Crowfoot.

Ranunculus sceleratus Linnæus, Sp. Pl. 551. 1753 [Europe].—Knieskern 5.—Britton 37.

Ditches and muddy banks of streams and marshes. Reported from Essex and Bergen Counties, and frequent in West Jersey and on the coastal strip to Cape May. Tends to become a weed.

Fl.—Mid-April to late June. *Fr.*—Early May to mid-July.

Middle District.—New Egypt, Pemberton (NB), Medford (S), Washington Park, Mickleton.

Coast Strip.—Beach Haven Terrace (L), Piermont (S), Five-Mile Beach, Cold Spring (OHB), Cape May.

Ranunculus recurvatus Poir. Wood Crowfoot.

Ranunculus recurvatus Poir. in Lam. Encycl. VI. 125. 1804 [Environs of New York].—Knieskern 5.—Britton 37.

Common in moist woods of the northern counties; less abundant southward in the Middle district.

Fl.—Late April to early June. *Fr.*—Early May to mid-June.

Middle District.—Farmingdale, New Egypt, Pemberton (C), Kinkora, Medford (S), Lindenwold, Sewell (S), Mullica Hill (NB), Mickleton, Swedesboro, Marlboro (NB), Elsinboro (C), Bridgeton (S).

Ranunculus pennsylvanicus L. f. Bristly Buttercup.

Ranunculus pennsylvanicus Linnæus, f. Suppl. 272. 1781 [Pennsylvania].—Willis 3.—Britton 37.—Keller and Brown 152.

Frequent in the swamps of the northern counties; rare southward, especially within our limits, where it occurs only in the upper Middle and Coast districts; possibly introduced, at some stations at least.

Fl.—Late June to early August. *Fr.*—Mid-July to late August.

Middle District.—Freehold (C), Long Branch, Pemberton, Camden (NB), Repaupo (NB).

Coast Strip.—Spray Beach (L).

Ranunculus septentrionalis Poir. Swamp Buttercup.

Ranunculus septentrionalis Poir. in Lam. Encycl. VI. 125. 1804 [North America].—Britton 37.

Swamps, borders of streams, etc. Common in the northern counties and frequent or occasional southward in the Middle and Cape May districts.

Fl.—Early May to early June. *Fr.*—Mid-May to late June.

Middle District.—Beverly, Delaire, Fish House, Camden, Kaighns Pt., Westville, Washington Park, Center Square, Mickleton, Swedesboro, Hancock's Bridge (S).

Cape May.—Cold Spring (OHB).

Ranunculus hispidus Michx. Hispid Buttercup.

Ranunculus hispidus Michaux, Fl. Bor. Am. I. 321. 1803 [Lower Carolina].

Ranunculus fascicularis Knieskern 6.—Willis 3.—Britton 37.

Woodlands of the Northern and Upper Middle districts; rather frequent, also rare in the lower Cape May peninsula.

Fl.—Late April to late May. *Fr.*—Early May to mid-June.

Middle District.—Freehold (Kn), Sea Bright (NB), Squan (Kn), New Egypt, Hightstown (C), Merchantville (C), Medford (S), Taunton (C), Mullica Hill (H), Mickleton.

Cape May.—Cold Spring.

BATRACHIUM S. F. Gray.

***Batrachium trichophyllum* (Chaix.). White Water Crowfoot.**

Ranunculus trichophyllus Chaix in Vill. Hist. Pl. Dauph. I. 335. 1786 [Valgandemar, France].

Ranunculus fluviatilis Barton, Fl. Phila. II. 26. 1818.

Ranunculus aquatilis var. *trichophyllus* Britton 35.

Batrachium trichophyllum Keller and Brown 152.

Ranunculus aquatilis var. *divaricatus* Knieskern 5.—Willis 2.

Batrachium divaricatum Keller and Brown 152.

Ponds and streams; not common. Occurs at a number of stations north of limits and at several points southward in West Jersey. I think there is no question but that Knieskern's record of *divaricatus* belongs to this species.

Fl.—Late May to late August.

Middle District.—Camden, Repaupo (H), Medford (KB), Salem, Squan and Shark River (Kn).

OXYGRAPHIS Bunge.

***Oxygraphis cymbalaria* (Pursh.). Seaside Crowfoot.**

Ranunculus cymbalaria Pursh, Fl. Am. Sept. I. 392. 1814 [Saline Marshes, Onondago Co., N. Y.].—Knieskern 5.—Willis 3.—Britton 36.

Oxygraphis cymbalaria Keller and Brown 153.

Edges of the salt marshes from Shark River to Brigantine; rare and local.

Coast Strip.—Shark River (NB), Ocean Grove (C), Manasquan (C), Pt. Pleasant (S), Brielle (NY), Ortley (NY), Brigantine, Atlantic City (NB and P), Ventnor.

THALICTRUM L.

Thalictrum dioicum L. Early Meadow Rue.

Thalictrum dioicum Linnæus, Sp. Pl. 545. 1753 [Canada].—Britton 35.

Common in rocky woods of the northern counties; very rare within our limits and confined to the Middle district.

Fl.—Late April to early May. *Fr.*—Early May to mid-May.

Middle District.—Pemberton (NB), Swedesboro.

Thalictrum revolutum DC. Purplish Meadow Rue.

Thalictrum revolutum Decandolle, Prodr. I. 12. 1824 [North America].

Thalictrum purpurascens Barton, II. 21. 1818.—Britton 35.

Frequent or occasional in woods of the northern counties; very rare and local southward in the Middle and Cape May districts.

Fl.—Late May to early July. *Fr.*—Late July to early September.

Middle District.—Farmingdale, Pt. Pleasant, Cooper's Creek (C), Swedesboro.

Coast Strip—Mays Landing (NB).

Cape May.—Cold Spring (OHB).

Thalictrum polygamum Muhl. Tall Meadow Rue.

Thalictrum polygamum Muhlenberg, Cat. 54. 1813 [Pa.]*.—Britton 35.

Thalictrum cornuti Knieskern 5.—Willis 2.

Common in swamps and moist thickets of the Northern and Middle districts, also on the coast strip south to Cape May.

The Meadow Rue is one of the familiar swamp plants of mid-summer in North and West Jersey, and after crossing the Pine Barrens it is one of the old friends that we find again in those rich swamps, where the interior country meets the edge of the great salt meadows of the coast.

The coast plant seems to be constantly shorter than the typical Pennsylvania form, with thicker leaves, but in time of flower and general structural characters they seem to be identical.

Fl.—Late June to early August. *Fr.*—Late August to early October.

* Cf. Gray Am. Jour. Sci., Ser. 3, XXXI. 236. 1886. Strictly speaking, this name has no status from Muhlenberg's catalogue, but I follow others in retaining it for the present.

Middle District.—Farmingdale (S), New Egypt, Hartford, Riverside, Springdale (S), Washington Park, Swedesboro, Yorktown.

Coast Strip.—Toms River (S), Ct. House, Cape May, Cold Spring.

Family BERBERIDACEÆ. May Apple, etc.

PODOPHYLLUM L.

Podophyllum peltatum L. May Apple.

Podophyllum peltatum Linnæus, Sp. Pl. 505. 1753 [N. America].—Willis 5.—Britton 42.

Common in moist woods in the northern counties; rare and local southward in the Middle district and southern Cape May peninsula.

Fl.—Late April to mid-May. *Fr.*—Mature during August, commonly after the foliage has perished.

Middle District.—Holmdel (C), Pt. Pleasant (C), Cream Ridge (Willis), New Egypt, Bordentown, Kinkora, Camden Co. (C), Gloucester (H), Yorktown, Swedesboro, Quinton, Elsinboro (C), Shilo (C).

Cape May.—Cold Spring (OHB).

Family MENISPERMACEÆ. Moonseed.

MENISPERMUM L.

Menispermum canadense L. Canada Moonseed.

Menispermum canadense Linnæus, Sp. Pl. 340. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 199. 1818.—Britton 42.

Common in moist woods and thickets in the northern counties and frequent in the Middle district and Cape May peninsula.

Its fruit is conspicuous in September, bearing a striking resemblance to chicken grapes.

Fl.—Early June to early July. *Fr.*—Late August to late September.

Middle District.—Sandy Hook (NB), Farmingdale, New Egypt, Holmdel (C), Medford (S), Camden (O), Gloucester (P), Red Bank, Swedesboro, Woodstown (NB).

Cape May.—Cape May (OHB).

Family LAURACEÆ. Sassafras.

SASSAFRAS Nees and Ebermaier.

Sassafras sassafras L. Sassafras.

Laurus Sassafras Linnæus Sp. Pl. 371. 1753 [Virginia, Carolina and Florida]. *Sassafras officinale* Knieskern 27.—Britton 213.

Common in woods and thickets throughout the State.

A characteristic tree of the Pine Barrens, occurring in a dwarfed condition, even on the "Plains."

Fl.—Mid-April to early May. *Fr.*—Late July to late August.

Middle District.—Farmingdale, New Egypt, Arney's Mt. (S), Merchantville, Medford, Springdale (S), Kaighns Pt., Woodbury, Salem (S), Bridgeton (NB), Dividing Creek.

Pine Barrens.—W. Plains (S), Bear Swamp (S), Landisville (T), Albion.

Coast Strip.—Manahawkin, Barnegat, Cox's, Surf City (L), Barnegat City Jnc. (L), Spray Beach (L), Atlantic City (S), Ocean City (S), Piermont (S), Anglesea (UP).

Cape May.—Cold Spring (S).

BENZOIN Fabricius.

Benzoin æstivale (L.). Spicewood.

Laurus æstivale Linnæus Sp. Pl. 369. 1753 [Virginia].

Benzoin odoriferum Knieskern 27.

Lindera Benzoin Britton 213.

Common in swamps throughout the State, except in the Pine Barrens, though it follows the edge of tide water streams for some distance inland.

Fl.—Late March to late April. *Fr.*—Early September to early October, persisting into winter.

Middle District.—Shark River, Pt. Pleasant (S), New Egypt, Bordentown, Birmingham, Moorestown, Merchantville, Medford (S), Delair, Sicklerville, (S), Clementon (S), Albion, Oaklyn, Washington Park, Glassboro, Swedesboro, Quinton, Salem (S), Marlboro (NB), Yorktown, Landisville (Pine Barrens?).

Coast Strip.—Waretown, Barnegat, Manahawkin, Coxe's, Absecon (S), Mays Landing (C).

Cape May.—Goshen, Ct. House, three mi. W. Court House (S), Sluice Creek (S).

Order PAPAVERALES.

Family PAPAVERACEÆ. Poppies, etc.

Key to the Species.

- a. Plants with a milky juice, flowers red. [*Papaver dubium*]*
- aa. Plants with a yellow or orange juice.
 - b. Erect branching herbs with yellow flowers. [*Chelidonium majus*]†
 - bb. Low; leaves and white flowers rising directly from the root.

Sanguinaria canadensis, p. 461

* Wild Poppy. A weed in field and waste places, not common in our range.

† Celandine. A frequent weed about houses and cultivated grounds in shady spots.

SANGUINARIA L.***Sanguinaria canadensis* L. Bloodroot.**

Pl. XLI, Fig. 2.

Sanguinaria canadensis Linnæus Sp. Pl. 505. 1753 [North America].—Knieskern 6.—Willis 6.—Britton 45.

Common in woods of the northern counties; south to upper Monmouth and northwestern Burlington Counties, and rare and local farther south in the Middle district, growing, according to Mr. Benj. Heritage, only on northern exposures. Very rare and local in the Cape May peninsula.

Fl.—Early April to late April. *Fr.*—Early June to late June.

Middle District.—Holmdel (C), Keyport (C), New Egypt, Bordentown (C), Kinkora, Little Timber Creek (P), Woodbury (C), five mi. S. Mickleton, Cumberland Co. (C).

Cape May.—Cold Spring – (OHB).

FAMILY FUMARIACEÆ. Fumatory, etc.*Key to the Species.*

- a.* Flowers white, with yellow at the tip. *Bicuculla cucullaria*, p. 461
aa. Flowers pale yellow. *Capnoides flavulum*, p. 461

BICUCULLA Adanson.***Bicuculla cucullaria* (L.). Dutchman's Breeches.***Fumaria Cucullaria* Linnæus, Sp. Pl. 699. 1753 [Virginia and Canada].*Diclytra Cucullaria* Britton 45.

Frequent in woods of the northern counties; very rare within our limits and confined to the Middle district.

Fl.—Early April to late April. *Fr.*—Early May to late May.

Middle District.—Keyport (C) [R. W. Brown], Sharptown [C. D. Lippincott].

CAPNOIDES Adanson.***Capnoides flavulum* (Raf.). Pale Corydalis.**

Corydalis flavula Rafinisque, in Desv. Jour. Bot. 1808 I., p. 224, acc. to D. C. Prodr. I. 129. 1824 [Philadelphia].

Frequent or occasional in woods of the northern counties; rare within our limits in the Middle and Cape May districts; close along the Delaware River.

Fl.—Early April to early May. *Fr.*—Early May to early June.

Middle District.—Kinkora, Gloucester.

Cape May.—On Delaware Bay (NB).

Family CRUCIFERÆ. Mustard, etc.

Key to the Species.

- a. Petals yellow.
 - b. Fruit short, not more than three times as long as broad.
 - c. Pods obovoid, leaves lanceolate. [*Camelina sativa*]¹
 - cc. Pods ovoid or globose, leaves pinnately parted.
 - d. Plant glabrous. *Radicula palustris*, p. 464
 - dd. Plant hirsute. *R. hispida*, p. 463
 - bb. Fruit much more than three times as long as broad.
 - c. Petals 7–15 mm. long. [*Brassica nigra*]²
 - cc. Petals smaller.
 - d. Pods 7–9 cm. long. [*Sisymbrium officinale*]³
 - dd. Pods 2–5 cm. long. [*Barbarea barbarea*]⁴
- aa. Petals white.
 - b. Pods divided into two cells transversely, fleshy sea coast plants.
 - Cakile edentula*, p. 463
 - bb. Pods divided into two cells longitudinally; short, rarely three times as long as wide.
 - c. Pods compressed at right angles to the plane of the partition, making it very narrow.
 - d. Pods cordate triangular, wedge-shaped at the base, hairs or some of them branched. [*Bursa bursa-pastoris*]⁵
 - dd. Pods oval or nearly circular. *Lepidium virginicum*, p. 465
 - cc. Pods compressed parallel with the plane of the partition, leaving it broad.
 - d. Petals 2 cleft. [*Draba verna*]⁶
 - dd. Petals entire. *Draba caroliniana*, p. 465
 - bbb. Pods divided into two cells longitudinally; four to many times as long as wide.
 - c. Hairs simple or none.
 - d. Leaves palmate. *Dentaria laciniata*, p. 465
 - dd. Leaves oblong or cordate.
 - c. Tuberous roots. *Cardamine bulbosa*, p. 464
 - cc. Fibrous roots. *Cardamine rotundifolia*, p. 465

We have but few native *Cruciferae* in southern New Jersey, but a number of our common weeds belong to this family, of which the following are of most frequent occurrence:

¹ False Flax, occasional in fields.

² Black Mustard, common in waste ground.

³ Hedge Mustard, common about houses, roadsides, etc.

⁴ Winter Cress, fields, meadows, etc., common.

⁵ Shepherd's Purse, a common field and garden weed.

⁶ Whitlow Grass, one of the earliest plants to appear in flower, very common in sandy fields.

ddd. Leaves pinnate.

e. Plant 2-9 dm. tall, segments of basal leaves 4-25 mm. wide. *C. pennsylvanica*, p. 464

ce. Plant 1-3 dm. tall, segments of basal leaves 1-3 mm. wide. *C. parviflora*, p. 464

cc. Hairs or some of them branched.

d. Plants small, less than 30 cm.

e. Leaves entire or barely toothed, 2-30 cm. high.

[*Stenophragma thaliana*][†]

ce. Leaves basal, pinnatifid, 10-30 cm. high.

Arabis lyrata, p. 466

dd. Plants tall, 30-120 cm.

e. Pods erect.

[*Arabis glabra*][‡]

ce. Pods recurved or spreading.

f. Plant glabrous.

A. laevigata, p. 466

ff. Lower part of stem hairy.

A. canadensis, p. 466

CAKILE Gaertner.

Cakile edentula (Bigel.). Sea Rocket.

Pl. LVI., Fig. 1.

Bunias edentula Bigelow, Fl. Bost. 157. 1814 [Cape Ann. and So. Boston].

Cakile americana Knieskern 7.—Willis 7.—Britton 52.

Cakile edentula Keller and Brown 160.

Sea beaches along the entire coast and for some distance up the Bay shore.

One of the most generally and regularly distributed species of the upper beach.

Fl.—Late June into November. *Fr.*—Late July through autumn.

Maritime Strip.—Sandy Hook (NB), Long Branch, N. Spring Lake (NB), Waretown, Surf City (L), St. Albans (L), Barrel Island (L), Spray Beach (L), Brigantine, Ocean City (S), Sea Isle City, Stone Harbor, Anglesea, Cape May.

RADICULA Hill.

Radicula hispida (Desv.). Hispid Yellow Cress.

Brachylobus hispidus Desv. Jour. Bot. II. 3: 183. 1814 [Pennsylvania].

Frequent in moist ground in the northern counties; occasional southward along the Delaware River.

Fl.—Early May into September. *Fr.*—Early July into autumn.

Middle District.—Delair, Kaighns Pt., Penns Grove (NB).

[†] Mouse-ear Cress, a common weed.

[‡] Tower Mustard, introduced about Cape May.

***Radicula palustris* (L.). Marsh Yellow Cress.**

Sisymbrium amphibium var. *palustre* Linnæus, Sp. Pl. 657. 1753 [N. Europe].

Distribution as in the last.

Fl.—Early May into September. *Fr.*—Early July into autumn.

Middle District.—New Egypt, mouth of Cooper's Creek, Swedesboro, Salem (NB).

CARDAMINE L.

***Cardamine pennsylvanica* Muhl. Pennsylvania Bitter Cress.**

Cardamine pennsylvanica Muhlenberg in Willd. Sp. Pl. III. 486 1800 [Pennsylvania].

Cardamine hirsuta Britton 49.

Common in damp woods and swamps in the northern counties and southward in the Middle district.

Fl.—Late April to mid-June. *Fr.*—Late May to late July.

Middle District.—Pemberton (NB), Delano, Delair, Medford (S), Taunton (C), Wenonah, Mantua, Camden (P), Washington Park, Mickleton, Mullica Hill (H), Atco (P), Elsinboro (C).

***Cardamine parviflora* L. Sand Bitter Cress.**

Cardamine parviflora Linnæus, Sp. Pl. Ed. 2. 914. 1763 [Europe].

Cardamine arnicola Britton.

Damp sandy soil along the Coast strip. Rare.

Fl.—Mid-April to mid-June. *Fr.*—Mid-May to mid-July.

Middle District.—Bay Head, Piermont.

***Cardamine bulbosa* (Schreb.). Bulbous Cress.**

Arabis bulbosa "Schreber," Muhlenberg, Trans. Am. Phil. Soc. 3:174. 1793 [Virginia].

Cardamine rhomboidea Knieskern 7.

Cardamine bulbosa Britton 49.

Frequent in swamps and moist woodland in the Northern and Middle districts.

Fl.—Late April to early June. *Fr.*—No fruiting material seen, apparently uncommon.

Middle District.—New Egypt, Kinkora, Delair, Pensauken (S), Medford (S), Taunton (C), Washington Park, Mickleton, Swedesboro, Penns Neck (C).

Cardamine rotundifolia Michx. Round-leaved Cress.

Cardamine rotundifolia Michaux, Fl. Bor. Am. II. 30. 1803 [High Mts. of Carolina].—Knieskern 7.—Willis 6.—Britton 50.

Reported from near the Delaware Water Gap (Britton). Freehold (Willis), Middletown, Mon. Co., cool shaded springs, very rare (Knieskern).

DENTARIA L.**Dentaria laciniata Muhl. Cut-leaved Pepper-root.**

Dentaria laciniata Muhlenberg, in Willdenow Sp. Pl. III. 479. 1800 [Pennsylvania].—Willis 6.

Cardamine laciniata Britton 49.

Frequent in moist woods of the northern counties, rare southward within our limits, entirely in the Middle district.

Fl.—Mid-April to early May. *Fr.*—Late May to mid-June.

Middle District.—New Egypt, Freehold (Willis), Bordentown, Camden Co. (C), Mullica Hill (H), Swedesboro, Acton.

LEPIDIUM L.**Lepidium virginicum Linn. Wild Pepper-grass.**

Lepidium virginicum Linnæus, Sp. Pl. 645. 1753 [Virginia and Jamaica].—Britton 52.

Frequent throughout in cultivated ground. Whether it ever occurred native in New Jersey is a difficult matter to determine.

Fl.—Mid-May into November. *Fr.*—Late July through autumn.

DRABA L.**Draba caroliniana Walt. Carolina Whitlow Grass.**

Draba caroliniana Walter, Fl. Car. 174. 1788 [South Carolina].—Willis 7.—Britton 50.

Reported from Bulls Island, Hunterdon Co., and South Amboy, Middlesex Co., and occasional in open sandy ground in West Jersey. Not collected recently.

April 14, immature fruit.

Middle District.—Burlington, Starr's on Cooper's Creek, Woodbury, Swedesboro (CDL), Clementon (KB), Vineland (KB).

ARABIS L.

Arabis lyrata L. Lyre-leaved Rock Cress.

Arabis lyrata Linnæus, Sp. Pl. 665. 1753 [Canada].—Barton, Fl. Phila. II. 56 1818.—Knieskern 7.—Britton 48.

Sandy or rocky soil of the Northern and Middle districts, and occasional on the Coast strip.

Fl.—Mid-April to early June, and sporadically into July.

Fr.—Late May to mid-July.

Middle District.—Bordentown, Medford, Westville, Washington Park, Woodbury, 3 miles south Mickleton, Bridgeton (NB).

Coast Strip.—Sea Bright (NB), Avalon, Mays Landing (NB).

Arabis lævigata (Muhl.). Smooth Rock Cress.

Arabis lævigata "Muhlenberg," Willdenow, Sp. Pl. 3:543. 1801 [Pennsylvania].—Britton 48.

Frequent in rocky woods of the northern counties, rare southward in the Middle district.

Fl.—Mid-April to late May. *Fr.*—July to August.

Middle District.—New Egypt.

Arabis canadensis L. Sickle-pod.

Arabis canadensis Linnæus, Sp. Pl. 665. 1753 [Virginia].—Britton 48.

Frequent in rocky woods of the northern counties, occasional southward in the Middle district.

Fl.—Late May to early July. *Fr.*—August to September.

Middle District.—Two miles north Mullica Hill (C), Swedesboro.*

Family CAPPARIDACEÆ. Capers.

POLANISIA Rafinesque.

Polanisia graveolens Raf. Clammy-weed.

Polanisia graveolens Rafinesque, Am. Journ. Sci. I. 378. 1819.—Willis 8 [Newburgh on the Hudson, Harrisburg on the Susquehanna].

Polanisia dodecandra Britton 53.

Sandy shores, Bergen Co., and at Long Branch, Monmouth Co., according to Willis' Catalogue; rare.

Possibly not a native, though other species with the same general range find their northernmost records in sporadic occurrences in New Jersey.

*The record for *Arabis hirsuta* Swedesboro, Lippincott (KB), proves to be this species.

Order SARRACENIALES.

Family SARRACENIACEÆ. Pitcher-Plants.

SARRACENIA L.

Sarracenia purpurea L. Pitcher Plant.

Plates LXIII. and LXIV., Fig. 2.

Sarracenia purpurea Linnæus, Sp. Pl. 510. 1753 [N. America].—Barton, Fl. Phila. II. 10. 1818.—Knieskern 6.—Willis 5.—Britton 44.—Keller and Brown 166.

Occasional or local in bogs of the northern, Middle and Cape May districts. Common in bogs and cedar swamps of the Pine Barrens.

This is one of the plants which makes the bogs of the Pine Barrens so attractive. Mingled with the button-capped stems of *Eriocaulon*, and accompanied by its close allies, the *Droseras*, it always attracts interest—its water filled cups sunk well down in the sphagnum and its flower scape standing aloft.

The pitchers are usually well formed and handsomely veined with crimson on a yellowish green ground color in plants which grow in the open bogs, but in the deep shade of the cedar swamps they are greener and narrower, with a greater development of flat keel on top.

Fl.—Late May to mid-June.

Middle District.—Freehold (Willis), Shark River, Five miles west of Swedesboro.

Pine Barrens.—Allaire, Farmingdale, Lakehurst (NY), Toms River, Forked River, Tuckerton (UP), Bamber, Pemberton, Brindletown, Speedwell, Berlin, Atco (UP), Malaga (UP), Pleasant Mill, Mouth of Batsto, Eighth St. (T), Hammonton (Bassett), Egg Harbor City, Petersburg (S).

Cape May.—Goshen (OHB), Cape May (OHB).

Family DROSERACEÆ. Sundews.

Key to the Species.

- a.* Blade of the leaf orbicular, flowers white. *Drosera rotundifolia*, p. 468
- aa.* Blade of the leaf spatulate, flowers white. *D. longifolia*, p. 468
- aaa.* Leaf filiform, not divided into blade and petiole, flowers large, pink.

D. filiformis, p. 469

DROSERA L.***Drosera rotundifolia* L. Round-leaved Sundew.**

Drosera rotundifolia Linnæus, Sp. Pl. 281. 1753 [Europe, Asia and America].
 —Barton Fl. Phila. I. 116. 1818.—Nuttall Gen. I. 141. 1818.—Knieskern
 8.—Britton 104.

Locally common in bogs throughout the State.

In the Pine Barrens this species seems to be the least abundant of the three Sundews, but it is the characteristic species of the cedar swamps where the others do not seem to occur. Here it grows deep down in the soft wet billowy masses of sphagnum moss, its slender flower stalk rising sometimes to a height of eight or ten inches. In open places it is much more stunted.

Fl.—Early July to late August, apparently slightly earlier than the next.

Middle District.—Shark River, New Egypt, Florence, Kaighns Pt., Lawnside (C), Swedesboro, Dividing Creek.

Pine Barrens.—Farmingdale, Allaire, Pt. Pleasant, Coxe's, Speedwell (S), Bear Swamp (S), Winslow (S), Mouth of Batsto, Hammonton (Bassett), Egg Harbor City, Mays Landing (S).

Coast Strip.—Spray Beach (L), N. Beach Haven (L).

Cape May.—Cold Spring (OHB).

Drosera longifolia* L. Oblong-leaved Sundew.*Pl. LXV.**

Drosera longifolia Linnæus, Sp. Pl. 282. 1753 [Europe].—Barton Fl. Phila. I. 116. 1818.—Nuttall Gen. I. 141.—Knieskern 8.

Drosera intermedia var. *Americana* Britton 104.

Drosera intermedia Keller and Brown 166.

Occasional or locally common in bogs of the Northern and Middle districts and common throughout the Pine Barrens and Cape May peninsula in damp situations.

This seems to be the most abundant and most generally distributed species of Sundew in South Jersey. There is considerable variation in the size and appearance of plants. Those of drier situations have a dense rosette-like cluster of small leaves from which the flower scape arises, while those growing in water or wet sphagnum develop a leafy stem often six to seven inches long; the uppermost leaves, from the midst of which the scape springs, being always the largest and freshest.

Fl.—Early July to late August.

Middle District.—Shark River, Florence, Delanco, Camden (UP), Medford, Griffith's Swamp, Kaighns Swamp, Dividing Creek.

Pine Barrens.—Belmar (NY), Toms River (S), Brindletown, Manchester (NY), Hanover, Speedwell (S), Bear Swamp (S), Ancora (UP), Atsion (S), White Horse (S), Atco (S), Landisville, Hammonton (Bassett), Batso (S), Egg Harbor City, Pancoast (S), Absecon (S), Woodbine (S), Tuckahoe (S), Sea Isle Jnc.

Coast Strip.—Seaside Park (UP), Holgate's (L), N. Beach Haven (L), Angelsea.

Cape May.—Whitesboro (S), Bennett, Cold Spring (S), Court House (UP).

***Drosera filiformis* Raf. Thread-leaved Sundew.**

Pl. LXVI., Fig. 2, and Pl. LXXXVIII., Fig. 3.

Drosera filiformis Rafinesque, Med. Rep. II. (5), 360. 1808 [County of Gloucester, N. J., and Sussex, Del.].—Pursh. Fl. Am. Sept. I. 211. 1814 [Tuckerton, N. J., 1805].—Knieskern 8.—Britton 104.—Keller and Brown 167.

Drosera tenuifolia Muhlenberg Cat. 23. 1813.

Common in wet sand throughout the Pine Barrens, and rarely in outlying pine barren islands in West Jersey and on the coast.

This is a far handsomer species than either of the preceding, and from the nature of its growth far more conspicuous. The large crimson-pink flowers are open only during part of the morning on sunshiny days, closing up at other times like the *Portulaca* of our gardens. The plants prefer open damp sand, where they are not shaded or crowded by other vegetation. Sometimes they grow very abundantly in such spots, and I have seen their erect filiform leaves in rank upon rank, the glutinous secretion on the glands glistening in the sunlight and making the whole patch look like dew covered spider webs, such as we frequently see on an early autumn morning. When examined closely the leaves will always be found to have small flies, mosquitoes and other insects attached to their thread-like glands.

Fl.—Late June to late August.

Middle District.—Lindenwold.

Pine Barrens.—Pt. Pleasant, N. Spring Lake (NY), 3 mi. S. New Egypt, Hanover, Browns Mills, Toms River, Forked River, Manchester (NY), Mayetta, Manahawkin, West Creek, Speedwell, Chatsworth, High Bridge, Atsion, Bear Swamp (S), Atco (UP), Ballinger's Mill, Pleasant Mills, Batsto, Mouth of Batsto, Quaker Bridge, Eighth St., Hammonton, Egg Harbor City, Absecon, Mays Landing (UP).

Coast Strip.—N. Beach Haven (L), Seaside Park (S).

Order ROSALES.

Family CRASSULACEÆ.*

PENTHORUM L.

Penthorum sedoides L. Ditch Stonecrop.

Penthorum sedoides Linnæus, Sp. Pl. 432. 1753 [Virginia].—Knieskern 15.—Britton 104.

Common in swamps and ditches of the northern counties and less frequently southward in the Middle district.

Fl.—Apparently June into September. *Fr.*—August into autumn.

Middle District.—Spring Lake, New Egypt, Medford (S), Kaighns Pt., Washington Park, Repaupo (C).

Family PARNASSIACEÆ. Grass of Parnassus.

PARNASSIA L.

Parnassia caroliniana Michx. Grass-of-Parnassus.

Parnassia caroliniana Michaux, Fl. Bor. Am. I. 184. 1803 [Carolina].—Knieskern 8.—Willis 22.—Britton 102.—Keller and Brown 169.

Frequent or locally common in the northern counties in swamps or wet meadows; known from within our limits only from New Egypt, where it was found by Dr. P. D. Knieskern.

Family SAXIFRAGACEÆ. Saxifrages.

Key to the Species.

a. Leaves all basal.

b. Flowers white, plant 1–3 dm. high. *Saxifraga virginicensis*, p. 471

bb. Flowers greenish, plant 3–9 dm. high.

c. Stamens 10, anthers yellowish green.

Saxifraga pennsylvanica, p. 471

cc. Stamens 5, anthers bright orange. *Heuchera americana*, p. 471

aa. A single pair of leaves about the middle of the scape. in addition to the basal ones, flowers white. *Mitella diphylla*, p. 472

aaa. Small, creeping, semi-aquatic plants, with crenate leaves; no petals, anthers bright orange. *Chrysosplenium americanum*, p. 472

* The minute *Tillæa aquatica* was found by Nuttall on tidal mud along the Delaware above Philadelphia, but only on the Pennsylvania side, so far as I can ascertain. It has not been collected there recently.

SAXIFRAGA L.

Saxifraga pensylvanica L. Swamp Saxifrage.

Saxifraga pensylvanica Linnæus, Sp. Pl. 399. 1753 [Virginia, Penna. and Canada].—Britton 101.

Swamps; common in the northern counties and less abundant southward in the Middle district and southern Cape May peninsula.

Fl.—Early May to late May. *Fr.*—Early June to early July.

Middle District.—Farmingdale, Middletown (C), New Egypt, Birmingham (C), Medford (S), Lindenwold, Mullica Hill (H), Swedesboro.

Cape May.—Cold Spring (OHB), Cape May.

Saxifraga virginensis Michx. Early Saxifrage.

Saxifraga virginensis Michaux, Fl. Bor. Am. I. 269. 1803 [Pennsylvania, Virginia and Carolina Mts.].—Knieskern 15.—Britton 100.

Common on dry banks in the northern counties, becoming less plentiful southward in the Middle district; rare in the lower Cape May peninsula.

Fl.—Early April to early May. *Fr.*—Mid-May to mid-June.

Middle District.—New Egypt, Pemberton, Bordentown, Kinkora, Medford (S), Sewell, Mickleton, Swedesboro, Mannington (C), Daretown (C), Bridgeton (C).

Cape May.—Cold Spring (OHB), very rare.

HEUCHERA L.

Heuchera americana L. Alum-root.

Heuchera americana Linnæus, Sp. Pl. 226. 1753 [Virginia].—Knieskern 15.—Britton 101.

Frequent in woods of the Northern counties, less plentiful southward in the Middle district, and rare in the lower Cape May peninsula.

Fl.—Late May to late June. *Fr.*—Mid-June to mid-July.

Middle District.—Farmingdale, Vincentown (C), Medford (S), Sewell (S), Camden (P), Mullica Hill (H), Blackwood (H), Woodbury, Swedesboro, Auburn (H).

Cape May.—Cape May (OHB).

MITELLA L.

Mitella diphylla L. Two-leaved Bishop's Cap.

Mitella diphylla Linnæus, Sp. Pl. 406. 1753 [North America].

Moist woods; occasional through the northern counties. Unknown within our limits until collected by Mr. J. H. Grove at New Egypt.

Fl.—Late April to mid-May. *Fr.*—Late May to mid-June.

Middle District.—New Egypt.

CHRYSOSPLENIUM L.

Chrysosplenium americanum Schw. Golden Saxifrage.

Chrysosplenium Americanum Schweinitz, in Hooker Fl. Bor. Am. I. 242. 1832 [Canada].—Knieskern 15.—Britton 101.

Common in shaded swampy spots in the northern counties, becoming rare and local southward in the Middle district.

Fl.—Early April to Mid-May. *Fr.*—Late May to early July.

Middle District.—Farmingdale, Hartford (P), Audubon (S), Mickleton, Swedesboro, Marlboro (C).

Family **HYDRANGEACEÆ. Hydrangeas.**

HYDRANGÆA L.

Hydrangæa arborescens L. Wild Hydrangea.

Pl. XCIV., Fig. 2.

Hydrangæa arborescens Linnæus, Sp. Pl. 397. 1753 [Virginia].

Banks of the Delaware River as far as Florence. Certainly very rare within our limits.

Fl.—Early June to mid-July. *Fr.*—About September, persisting over winter.

Middle District.—Bordentown (C), Florence.

Family **ITEACEÆ. Virginia Willow.**

ITEA L.

Itea virginica L. Virginia Willow.

Itea virginica Linnæus, Sp. Pl. 199. 1753 [Virginia].—Barton Fl. Phila. I. 118. 1818.—Knieskern 15.—Willis 22.—Britton 102.—Keller and Brown 170.

Frequent in Pine Barren swamps and locally in West Jersey and the Cape May peninsula.

This shrub, which ranges no farther north than New Jersey, resembles *Leucothoe* to some extent in general appearance, but the petals are separate and the racemes terminal and not secund.

Fl.—Early June to late June. *Fr.*—About September, persisting over winter.

Middle District.—Pemberton (C), Medford, Kaighns Pt., Repaupo, Bridgeport (H), Glassboro (S), Salem (S), Elmer (P), Dividing Creek.

Pine Barrens.—Manchester (Kn), Toms River (Bassett), Two miles south New Egypt, Middletown, Speedwell, White Horse, Atsion, Quaker Bridge, Clementon, Berlin, Williamstown Jnc., Sicklerville, Andrews, Cedar Brook, Inskip, Pleasant Mills, Folsom, Hammonton, Malaga (UP), Mays Landing, Egg Harbor City (P), Dennisville (P).

Cape May.—Goshen (OHB), Dias Creek.

Family GROSSULARIACEÆ. Gooseberries and Currants.

RIBES L.

Ribes rotundifolium Michx. Wild Gooseberry.

Ribes rotundifolium Michaux, Fl. Bor. Am. I. 110. 1803 [High Mountains of Carolina].—Britton 103.

Frequent or common in rocky woods of the northern counties; reported once within our limits at Seabright (Britton), perhaps an escape.

Family HAMAMELIDACEÆ. Witch Hazel, etc.

Key to the Species.

- a. Leaves oval or obovate, repand dentate, flowers with long, twisted, yellow petals, blooming in autumn. *Hamamelis virginiana*, p. 473
- aa. Leaves star-like, with five acute lobes, flowers inconspicuous in a cluster, blooming in spring, fruit a prickly, long pedicelled ball. *Liquidambar styraciflua*, p. 474

HAMAMELIS L.

Hamamelis virginiana L. Witch Hazel.

Pl. XCIII., Fig. 1.

Hamamelis virginiana Linnæus, Sp. Pl. 124. 1753 [Virginia].—Knieskern 15.—Britton 104.

Frequent in damp woods of the northern counties and less abundant southward in the Middle and Coast districts.

Fl.—Early October to late November or into December, as the leaves are falling. *Fr.*—Early autumn of the second season.

Middle District.—Freehold (C), Farmingdale, New Egypt, Birmingham, Kinkora, Camden (CP), Springdale (S), Westville, Glassboro, Albion, Racoon Creek, Dividing Creek.

Coast Strip.—Manahawkin.

LIQUIDAMBAR L.

Liquidambar styraciflua L. Sweet Gum.

Liquidambar styraciflua Linnæus, Sp. Pl. 999. 1753 [Virginia].—Knieskern 15.
—Willis 28.—Britton 105.

Common in woods throughout our region, except in the Pine Barrens and in those parts of the coastal plain which extend north of our limits. Also at Lake Hopatcong, Morris Co., and for a short distance up the Delaware and Hudson Rivers in Hunterdon and Bergen Counties.

The Sweet Gum and Willow Oak are probably the best trees by which to trace the line separating the Pine Barrens from the Middle district, while to the westward their range stops short at the fall line along the Delaware.

On the coast I have found both species occupying little dry ground islets in the salt marshes, a mile from the mainland, while all along the Coast strip proper the Sweet Gum occurs, even running up the Egg Harbor River to Mays Landing along with other coastal species.

Fl.—Late April to late May apparently, when the leaves are partly expanded. *Fr.*—Early autumn, persistent in part through the winter.

Middle District.—Farmingdale, Belmar (UP), Pt. Pleasant (S), New Egypt, Crosswick's Creek, Delanco (S), Arney's Mt. (S), Birmingham, Medford, Chairville (S), Oaklyn (S), Lawnside (S), Sicklerville, Glassboro, W. Deptford, Mickleton, Swedesboro, Yorktown, Salem (S), Dividing Creek, Beaver Dam (S), below Millville.

Coast Strip.—Manahawkin, Beesley's Pt. (S), Petersburg, Mays Landing (S), Anglesea.

Cape May.—Seaville (S), Dias Creek (S), Bennett, Cold Spring (S), Court House.

Family PLATANACEÆ. Buttonwoods.

PLATANUS L.

Platanus occidentalis L. Buttonwood.

Platanus occidentalis Linnæus, Sp. Pl. 999. 1753 [North America].—Knieskern 28.—Britton 219.

Along streams in the Northern and Middle districts. The only Pine Barren stations we have seen are obviously of introduced trees.

Normally a tree of open river valleys, the Buttonwood finds congenial conditions only in the Delaware Valley.

Fl.—Early May to mid-May, when the leaves are partly grown. *Fr.*—Autumn, persistent, in part, through the winter.

Middle District.—New Egypt, Swedesboro, Medford (S), introduced about houses at numerous stations in the Pine Barrens and elsewhere, Toms River, Speedwell, etc.

Family ROSACEÆ. Roses, etc.

Key to the Species.

- a. Flowers yellow.
 - b. Leaves digitate, 3-5 foliate.
 - c. Flowers cymose, leaflets 3. [*Potentilla monspeliensis*]¹
 - cc. Flowers solitary on axillary peduncles.
 - d. Earliest flower from node above the first well developed internode. *P. pumila*, p. 482
 - dd. Earliest flower from node above the second or third well developed internode. *P. canadensis*, p. 482
 - bb. Leaves pinnate.
 - c. Flowers 12 mm. broad, in dense cymose inflorescence. *Drymocallis arguta*, p. 481
 - cc. Flowers 3 or 4, remote in a branched inflorescence.
 - d. Root leaves, at least some of them, lobed or entire, flowers pale greenish yellow. *Geum flavum*, p. 483
 - dd. Root leaves all pinnate, flowers golden yellow. *G. strictum*, p. 483
 - ccc. Flowers scattered in a long, slender, spike-like raceme.
 - d. Leaflets, exclusive of the small intermediate ones, 5-9 ovate or obovate.
 - e. Root not thickened, leaflets resin-dotted below. *Agrimonia rostellata*, p. 483
 - cc. Root thickened toward the end, leaflets velvety tomentose. *A. mollis*, p. 484
 - dd. Leaflets 11-13, lanceolate. *A. parviflora*, p. 484
 - aa. Flowers pink.
 - b. Large, 1.5 in broad or more, leaves pinnate, stem prickly.
 - c. Leaf rachis glabrous or puberulent.
 - d. Leaves serrulate, infra-stipular prickles short, 2-4 mm. long, broad-based and decidedly curved, stipules narrowly linear. *Rosa carolina*, p. 485

¹ Rough Cinquefoil, apparently an introduced weed.

- dd. Leaves more coarsely and deeply serrate, infra-stipular, prickles longer, stipules more dilated.
 e. Prickles decidedly curved, leaves somewhat shining above. *R. virginiana*, p. 485
 ee. Prickles straight, leaves dull above. *R. humilis*, p. 485
 cc. Leaf rachis very glandular, leaflets doubly serrate, densely resinous beneath. [*R. rubiginosa*]²
 bb. Small, in dense racemous panicles, leaves simple, stem not prickly.
 c. Leaves densely tomentose beneath. *Spiræa tomentosa*, p. 477
 cc. Leaves glabrous beneath, flowers whitish. *S. latifolia*, p. 477
 aaa. Flowers white.
 b. Woody shrubs.
 c. Flowers small, in dense corymbs or racemous panicles, leaves simple, stems not prickly.
 d. Flowers in umbel-like corymbs, pods membranaceous purplish, leaves palmately lobed. *Opulaster opulifolius*, p. 477
 dd. Flowers in racemous panicles. *Spiræa latifolia*, p. 477
 cc. Flowers large. (Blackberries and Raspberries.)
 d. Fruit cap-shaped, fitting over the receptacle from which it separates when ripe, leaves white beneath. *Rubus occidentalis*, p. 478
 dd. Fruit not separating from the receptacle, forming a solid berry of numerous segments.
 e. Leaves white tomentose, beneath. *R. cuneifolius*, p. 479
 ee. Leaves smooth or velvety beneath, not white.
 f. Branches of the inflorescence prickly and glandular. *R. argutus*, p. 479
 ff. Branches of the inflorescence pubescent, but nearly or quite devoid of prickles or glands. *R. frondosus*, p. 480
 bb. Trailing vines.
 c. Leaves 3-5 foliate, stems prickly.
 d. Fruit black, leaves membranaceous, not shining.
 e. Flowers several on each raceme. *R. villosus*, p. 480
 ee. Flowers solitary. *R. v. enslenii*, p. 480
 dd. Fruit reddish, leaves subcoriaceous, shining. *R. hispidus*, p. 480
 cc. Leaves round—heart-shaped, crenate. *Dalibarda repens*, p. 481
 ccc. Leaves 3 foliate, running only by stolons. *Fragaria virginica*, p. 481
 bbb. Herbs, not trailing.
 c. No stem, flower peduncles arising from root, leaves 3-foliate, plant stoloniferous. *Fragaria virginica*, p. 481
 cc. A common stem present.
 d. Leaves regularly 3-foliate, almost sessile, petals linear lanceolate. *Porteranthus trifoliatus*, p. 478
 dd. Leaves pinnate, 3-foliate or entire, petals not linear lanceolate.

² Sweetbriar, well established along the coast strip, in thickets.

e. Leaves regularly many-pinnate, flowers in a long, slender cylindrical spike. *Sanguisorba canadensis*, p. 484

ce. Leaves various, lower often 3-5 pinnate or entire, upper generally 3-parted.

f. Receptacle of the fruit densely hairy.

Geum canadense, p. 482

ff. Receptacle of the fruit glabrous or nearly so.

G. virginianum, p. 483

OPULASTER Medicus.

Opulaster opulifolius (L.). Ninebark.

Spiræa opulifolia Linnæus, Sp. Pl. 489. 1753 [Virginia and Canada].—Barton I. 230. 1818.

Physocarpa opulifolia Britton 92.

River banks of the northern counties, following down the Delaware as far as Camden.

Fl.—Late May to early June. *Fr.*—Mid-June to late June or July, persisting into autumn.

Middle District.—Bordentown (NB), Crosswicks Creek (C), Riverton, Camden (P), Cooper's Creek (C), National Park.

SPIRÆA L.

Spiræa latifolia "Aiton" Borkh. Meadow Sweet.

Spiræa latifolia "Aiton," Borkhausen, Handbk. Forst. Bot. II. 1871. 1800 [North America].—Knieskern 13.—Britton 93.

Spiræa alba Barton, Fl. Phila. I. 229. 1818.

Edges of swamps or wet meadows; rather frequent in the northern counties, but rare southward mainly in the Middle district and apparently entering the Pine Barrens only on the borders and along streams.

Fl.—Early July to late August. *Fr.*—Early September into October.

Middle District.—Farmingdale, Brindletown, Florence, Center Square.

Pine Barrens.—Hanover, Above Atsion, Egg Harbor City, Mays Landing (NB).

Spiræa tomentosa L. Hardhack.

Spiræa tomentosa Linnæus, Sp. Pl. 489. 1753 [Philadelphia].—Knieskern 13.—Willis 20.—Britton 93.

Frequent in low grounds nearly throughout the State, but apparently occurring in the Pine Barrens much as does the preceding.

Fl.—Early July to early September. *Fr.*—Early September into October.

Middle District.—Farmingdale (S), Avon, Pt. Pleasant, New Egypt, Burlington (UP), Hartford, Fish House, Paulsboro, Repaupo (UP), Center Square, Westville, Bellevue, Mickleton (UP), Woodbury (UP).

Pine Barrens.—Hammonton (Bassett), Batsto (S), Crowleytown, Weekstown, Speedwell (S), Belleplaine (S), Mays Landing (NB). [In part, at least, incursions from coast?]

Cape May.—Cape May, W. Cape May (OHB).

PORTERANTHUS Britton.

Porteranthus trifolius (L.). Indian Physic.

Spiraea trifoliata Linnæus, Sp. Pl. 490. 1753 [Virginia and Canada].

Rather frequent in rich woods of the northern counties, but very rare within our limits and known only from Prospertown, near New Egypt, Ocean Co., where it was discovered by Mr. J. H. Grove.

The generic name of the plant is in honor of Dr. Thos. C. Porter, formerly professor of botany at Lafayette College, Easton, Pa., the leading authority of his time on the flora of Pennsylvania, as well as of the New Jersey side of the Delaware near Easton.

Fl.—Late May to mid-June. *Fr.*—Late June to mid-July.

Middle District.—New Egypt.

RUBUS L.

Rubus occidentalis L.* Blackcap Raspberry.

Rubus occidentalis Linnæus, Sp. Pl. 493. 1753 [Canada].—Willis 21.—Britton 94.

Common in thickets in the northern counties and occasional southward in the Middle and Cape May districts. Possibly some of the southern records may be based upon escapes from gardens.

Fl.—Early May to late May. *Fr.*—Late June to mid-July.

Middle District.—Freehold (NB), Farmingdale, Birmingham, Medford (S), Fish House, Delair, Lawnside (S), Riddleton.

Coast Strip.—Beach Haven (L), probably introduced.

Cape May.—Fishing Creek (OHB), Cold Spring (OHB).

* *Rubus americanus* is cited by Willis on Dr. Torrey's authority as occurring in Monmouth Co., but no more exact data are available and no specimens extant. *Rubus strigosus* grew at Woodbury, according to Dr. Barton (1818), but it was no doubt an escape. The species does grow native as far south as Phillipsburg, however.

Rubus cuneifolius Pursh. Sand Blackberry.

Rubus cuneifolius Pursh, Fl. Am. Sept. 347. 1814 [New Jersey to Carolina].
 —Barton, Fl. Phila. I. 232. 1818.—Knieskern 14.—Willis 21.—Britton
 94.—Keller and Brown 174.

Common in sandy ground throughout our region and recorded at but two points farther north in the State—South Amboy and Rosemont.

This is the characteristic blackberry of southern New Jersey. It does not grow high, usually not over three feet, but frequently covers a considerable area of ground. The fruit is seedy and too sweet and is not picked to any extent.

Fl.—Late May to early July. *Fr.*—Mid-July to late August

Middle District.—New Egypt, Medford (S), Lindenwold.

Pine Barrens.—Bear Swamp (S), Speedwell (S), Landisville (T), Egg Harbor City, Quaker Bridge (UP).

Coast Strip.—Holgate's (L), Sherburn's (L), Atlantic City (S), Five-Mile Beach.

Cape May.—Cape May (OHB).

Rubus argutus Link. Tall Blackberry.

Rubus argutus Link, Enum. Hort. Berol. 11. 60 [North America].—Keller and Brown 174.

Rubus villosus Britton 94 (in part.)—Knieskern 13 (in part.).

Rubus nigrobaccus Keller and Brown 174 (in part.).

Fields and thickets of the Middle and Coast districts and Cape May peninsula; common. Probably also in the northern counties.

So variable are the Blackberries and so unsatisfactory the character of most of the supposed species, that it is difficult to decide whether we really have more than one species besides *R. cuneifolius*. According to Mr. Bicknell's views, which seem to be the most logical so far advanced, *R. argutus* should be the name of the most abundant species of our coastal plain region.

Fl.—Mid-May to mid-June. *Fr.*—Mid-July to mid-August.

Middle District.—New Egypt, Crosswicks, Delanco, Medford (S).

Pine Barrens.—Speedwell.

Coast Strip.—Pt. Pleasant, Beach Haven (L), Peahala (L), Tucker's (L), Barnegat City (L), Holgate's (L), Ocean City (S), Piermont, Angelsea.

Cape May.—Cape May (S).

Rubus frondosus Bigel. Bush Blackberry.

Rubus frondosus Bigelow, Plants of Boston, Ed. II., 199. 1824 [Boston, Mass.]

Frequent in the northern counties and occasional in the Middle district, especially along the Delaware river. Distinguished from the last by having the branches of the inflorescence pubescent, but nearly or quite glandless, and with few or no prickles.

Fl.—Mid-May to mid-June. *Fr.*—Mid-July to mid-August.

Middle District.—Delanco, Moorestown.

Rubus villosus Ait. Dewberry.

Rubus villosus Aiton, Hort. Kew, 2: 210. 1789 [North America].

Rubus canadensis Knieskern 13, Britton 94.

Frequent throughout, but decidedly less common in the Pine Barrens.

The same uncertainty prevails here as in the high blackberries, as to just how many species we have.

Fl.—Mid-May to mid-June. *Fr.*—Early July to early August. Probably slightly earlier than *R. argutus*.

Middle District.—Washington Park, Medford (S), Lindenwold (S), Sicklerville.

Pine Barrens.—Berlin (S), Head of Batsto (S), Landisville (T), Albion.

Coast Strip.—Beach Haven (L), Tucker's (L), Spray Beach (L), Atlantic City (S), Stone Harbor (S).

Rubus villosus enslenii Tratt. Single-flowered Dewberry.

Rubus enslenii Trattennink, Ros. III. 63. 1823 [North America].

Rather frequent. Distribution and flowering probably similar to the last.

Fl.—Mid-May to mid-June. *Fr.*—Mid-July to mid-August.

Middle District.—Farmingdale.

Pine Barrens.—Cedar Brook.

Coast Strip.—Pt. Pleasant, Spray Beach, Stone Harbor.

Rubus hispidus L. Hispid Swamp Blackberry.

Rubus hispidus Linnæus, Sp. Pl. 493. 1753 [Canada].—Knieskern 14.—Britton 94.

Rubus flagellaris Barton, Fl. Phila. I. 234, II. 216. 1818.

Plentiful in shaded swampy ground throughout the State. A common species of the cedar swamps and shady moist ground in the Middle district.

Fl.—Early June to early July. *Fr.*—Late July to late August.

Middle District.—Freehold (NB), Farmingdale (S), Burlington, Medford (S), Sicklerville, Washington Park, Glassboro, Swedesboro, Yorktown.

Pine Barrens.—Forked River, Manahawkin, Cox's Speedwell (S), Bear Swamp (S), Albion, Jackson, Winslow Inc., Mouth of Batsto.

DALIBARDA L.

Dalibarda repens L. *Dalibarda*.

Dalibarda repens Linnæus, Sp. Pl. 491. 1753 [Canada].—Keller and Brown 175.

Very rare and known from but one station in the State—two miles northwest of Swedesboro—where it was detected by Mr. Charles D. Lippincott. The occurrence of such a distinctly boreal plant in this locality is extremely interesting.

Fl.—July 8, 1894, petals dropping.

Middle District.—Two miles northwest of Swedesboro.

FRAGARIA L.

Fragaria virginiana Duchesne. *Virginia Strawberry*.

Fragaria virginiana Duchesne, Hist. Nat. Fras. 204. 1766 [America].—Knieskern 13.—Britton 95.

Common in the northern counties in fields; less common southward in the Middle and Coast districts. This is the common wild strawberry of the New Jersey lowlands. Another species has been recorded as *F. vesca* in Ocean and Monmouth Counties (Knieskern) and about Camden (Martindale). If these records refer to true *F. vesca* they are, of course, based upon introduced plants, as the species is not native here. The allied native species, *F. americana*, is a mountain plant, and its occurrence on the coastal plain does not seem probable. There are no New Jersey specimens in the Martindale Herbarium.

Fl.—Late April to late May. *Fr.*—Late May to late June.

Middle District.—Medford (S), Lindenwold (S), Blackwood, Washington Park.

Coast Strip.—Toms River (NB), Forked River, Beach Haven (L), Atlantic City (S), Piermont (S).

DRYMOCALLIS Fourr.

Drymocallis arguta (Pursh.). *Tall Cinquefoil*.

Potentilla arguta Pursh, Fl. Am. Sept. 736. 1814 [Upper Louisiana].—Britton 96.

Drymocallis arguta Keller and Brown 175.

Frequent in rocky places in the northern counties. Local in our region and in part, at least, introduced. Stations close to the Delaware River shores might well be established by plants washed down from farther up stream, as it grows naturally at Lambertville and Phillipsburg.

Middle District.—Riverton (KB).

Pine Barrens.—Winslow Jnc. (introduced).

POTENTILLA L.*

Potentilla canadensis L. Cinquefoil.

Potentilla canadensis Linnæus, Sp. Pl. 498. 1753 [Canada].—Barton Fl. Phila. I. 236. 1818.—Knieskern 13.—Britton 96.

Potentilla canadensis var. *simplex* Britton 96.

Common in dry fields and woods in the northern counties and southward in the Middle district, and very rare on the coast to Cape May.

The specimens from Farmingdale and Yorktown are referable to variety *simplex*, a form of little or no taxonomic value.*

Fl.—Early May to mid-June.

Middle District.—Farmingdale, New Egypt, Bordentown, Burlington, Kin-kora, Delair, Fish House, Medford (S), Lindenwold (S), Washington Park, Swedesboro, Yorktown.

Pine Barrens.—Waretown, Landisville (introduced).

Coast Strip.—Barnegat City (L), Cold Spring (OHB).

Potentilla pumila Poir. Dwarf Cinquefoil.

Potentilla pumila Poir in Lamarck, Encycl. Meth. V. 594. 1804 [North America].

Distribution the same as the preceding, but occurs more abundantly on the coast strip.

Fl.—Late April to late May.

Middle District.—Bordentown, Camden, Clementon, Quinton.

Coast Strip.—Surf City (L), N. Beach Haven (L), Harvey Cedars (L), Palermo, Five-Mile Beach.

GEUM L.

Geum canadense Jacq. White Avens.

Geum Canadense Jacquet, Hort. Vind. II. 82, pl. 175. 1772 [Canada].

Geum album Britton 94.

* *P. argentea* L., Silvery Cinquefoil, must be regarded as a weed so far as our region is concerned.

Common in woods and thickets of the northern counties, and southward in the Middle and Coast districts to the Cape May peninsula. Only once reported from the Pine Barrens, at Winslow (Bassett) probably an introduction.

Fl.—Early June to late July.

Middle District.—Pt. Pleasant (S), New Egypt, Pemberton (C), Arney's Mt. (S), Moorestown (C), Medford (S), Kirkwood (C), Oaklyn (S), Mickleton, Swedesboro.

Coast Strip.—Sandy Hook, Longport, Beesley's Pt. (S), Palermo, Piermont (S).

Cape May.—Cold Spring.

***Geum flavum* (Porter). Cream-colored Avens.**

Geum album var. *flavum* Porter, Bull. Torr. Bot. Club XVI. 21. 1889 [Eastern Penna. and N. J.].

Occasional in the northern counties and south into the Middle district; in woods and thickets.

Fl.—Late June to mid-August.

Middle District.—Pt. Pleasant (S), Medford (S), Clementon.

***Geum virginianum* L. Rough Avens.**

Geum virginianum Linnæus Sp. Pl. 500. 1753 [Virginia].—Willis 20.—Britton 94.

Woods and thickets of the northern counties, not rare; and occasional in the Middle district.

Fl.—Mid-May to early July.

Middle District.—Farmingdale, Mickleton (S), Swedesboro.

***Geum strictum* Ait. Yellow Avens.**

Geum strictum Aiton, Hort. Kew. II. 217. 1789 [North America].—Knieskern 13.—Britton 94.—Keller and Brown 177.

Frequent in low ground in the northern counties; very rare southward to our limits in the upper Middle district.

Fl.—Early June to late July.

Middle District.—New Egypt, also reported in Britton's Catalogue from Freehold, Mickleton and Camden, some or all probably *G. virginianum*.

AGRIMONIA L.

***Agrimonia rostellata* Wallr. Woodland Agrimony.**

Agrimonia rostellata Wallroth, Beitr. I: 42. 1842 [Pennsylvania].

Woods and thickets; probably frequent northward; rare within our limits and confined to the Middle district. Supposed specimens of *A. gryposepala* all prove to be this.

Fl.—Late July to early September. *Fr.*—Mid-August to late September.

Middle District.—Haddonfield, Oaklyn (S), Swedesboro.

***Agrimonia mollis* (Torr. and Gray). Soft Agrimony.**

Agrimonia eupatoria var. *mollis* Torrey and Gray, Fl. N. A. I. 431. 1840 [Red River, Ark.].

Habitat and distribution like the above, but occurs also on the Cape May peninsula.

Fl.—Mid-July to mid-September. *Fr.*—Early August to early October.

Middle District.—Mt. Holly, Oaklyn (S).

Cape May.—Court House, Cold Spring (OHB).

***Agrimonia parviflora* Soland. Many-flowered Agrimony.**

Agrimonia parviflora Solander, in Aiton Hort. Kew. II. 130. 1789 [N. America].—Britton 97.

Woods and thickets; not very common northward, occasional or frequent in the Middle and Coast districts southward.

Fl.—Mid-July to early September. *Fr.*—Mid-August to late September.

Middle District.—New Egypt, Riverton, Washington Park.

Coast Strip.—Waretown, Manahawkin.

SANGUISORBA L.

***Sanguisorba canadensis* L. Burnet.**

Pl. LXVII., Fig. 2.

Sanguisorba canadensis Linnæus, Sp. Pl. 117. 1753 [Canada].—Knieskern 13. —Kellar and Brown 178.

Poterium canadense Britton 97.—Willis 20.

Open swamps; frequent in the northern counties and locally in the Middle district and down the Coast strip to Cape May County.

Fl.—Early August to early October.

Middle District.—Freehold (Kn), New Egypt, Hartford, Moorestown, Burlington, Delanco, Camden, Haddonfield, Mullica Hill (H), Mickleton (NB), Swedesboro, Auburn.

Coast Strip.—Palermo, Cape May Ct. House.

ROSA L.

Rosa carolina L. Swamp Rose.

Rosa carolina Linnæus, Sp. Pl. 492. 1753 [Carolina].—Knieskern 14.—Britton 98.

Rosa corymbosa Barton, Fl. Phila. I. 231. 1818.

Common in swamps throughout the State, except in the Pine Barrens. The common tall rose of the swamps.

The occurrence of the plant at Weymouth is of interest, as it may indicate a remnant of early coastal intrusion, for before the dam was constructed at Mays Landing the head of tidewater must have been higher up, and it is quite likely that some plants of the coast strip penetrated farther than is now possible.

Fl.—Late June to late July. *Fr.*—Late summer and autumn, persisting into winter.

Middle District.—Farmingdale, Pt. Pleasant (S), Haddonfield (S), Camden, Washington Park, Albion, Tomlin, Sicklerville (S).

Coast Strip.—Barnegat City (L), Harvey Cedars (L), Ship Bottom (L), Peahala (L), Surf City (L), Cox's, Beesley's Pt. (S), Ocean City (S), Cold Spring (S), Cape May (S) and apparently by way of the Egg Harbor River to Weymouth.

Rosa humilis Marsh. Low Rose.

Rosa humilis Marshall Arb. Am. 136. 1785 [Pennsylvania].—Britton 98.

Common in dry soil in the Northern and Middle districts. This is the common dwarf rose of old fields and wood edges, usually about two feet high, with straight slender prickles, and with the flowers frequently solitary.

Fl.—Mid-June to mid-July. *Fr.*—Late summer and autumn, persisting into winter.

Middle District.—Farmingdale, Pt. Pleasant (S), New Egypt, Haddonfield (S), Medford (S), Albion, Sicklerville, Swedesboro, Yorktown.

Pine Barrens.—Landisville (introduced?).

Rosa virginiana Mill.* Glossy Rose.

Rosa virginiana Miller, Gard. Dict. Ed. 8. 1768 [Virginia].

Rosa lucida Knieskern 14.

Rosa humilis var. *lucida* Britton 98.

* A record for *R. blanda* is given by Willis for Freehold. It has never been verified and the occurrence is extremely improbable. Therefore it seems safe to reject it.

Northern and Coast districts, frequent, and occasional in the Middle district. This rose is taller than the preceding, with heavier more or less curved prickles and the flowers usually in corymbs. Normally, it seems to grow in moister spots, but on the coast islands, where *R. humilis* is absent, it grows in various situations, those bushes which grow in the driest ground being dwarfed, but obviously the same stock as the others. In the Middle district this species is absent, *R. humilis* being the common form, while in the Pine Barrens no roses occur.

Fl.—Mid-June to mid-July. *Fr.*—Late summer and autumn, persisting into winter.

Coast District.—Sandy Hook, Seaside Park, Barnegat City (L), Beach Haven (L), Beach Haven Terrace (L), Surf City (L), Atlantic City (S), Ocean City (S), Five-Mile Beach, Cape May (S).

Family POMACEÆ. Apples, etc.

Key to the Species.

- a. Mature carpels soft, cartilaginous; limbs and branches not spiny.
 - b. Leaves rather coarsely more or less irregularly serrate, those on sterile shoots sometimes lobed. Fruit greenish, *Malus angustifolia*, p. 486
 - bb. Leaves finely and regularly serrate.
 - c. Serrations somewhat curved inward at the tip, leaves all distinctly narrowed toward the base, blade on fully developed leaves 65 mm. long.
 - d. Fruit black.
 - e. Leaves glabrous beneath. *Aronia nigra*, p. 487
 - ee. Leaves pubescent beneath. *A. atropurpurea*, p. 487
 - dd. Fruit red, leaves pubescent beneath. *A. arbutifolia*, p. 487
 - cc. Serrations very sharp, not curved at tip, some of the leaves, at least, rounded at base; blade not over 50 mm. long.
 - d. Leaves not cordate at base. *Amelanchier intermedia*, p. 488
 - dd. Leaves cordate at base. *A. canadensis*, p. 488
- aa. Mature carpels very hard and bony, branches armed with stout spines.
 - b. Leaves not lobed.
 - c. Calyx lobes entire, leaves thick shining obovate, spines 3–18 cm. long. *Crataegus crusgalli*, p. 489
 - cc. Calyx lobes serrate, corymbs 1–7 flowered. *C. tomentosa*, p. 489
 - bb. Leaves lobed. *C. pruinosa*, p. 489

MALUS Hill.

Malus angustifolia (Ait.). Narrow-leaved Crab Apple.

Pyrus angustifolia Aiton, Hort. Kew. II. 176. 1789 [N. America].—Britton 99.
Malus angustifolia Keller and Brown 179.—VanPelt, Bartonian I. 26. 1909.

Thickets and wood edges of lower Cape May County frequent, also southwest of Landisville. First detected in the State by Mr. Albert Commons at Cape May, July 18, 1882. This is the only Crab-apple that grows in our district, the larger *M. coronaria* does not occur south of Trenton.

Fl.—Early May to late May. *Fr.*—Early autumn until frost.

Cape May.—One mile west Court House, Cold Spring, Cape May.

Pine Barrens?—Landisville, probably by way of Manantico Creek, from the Bay Shore.

ARONIA Medicus.

Aronia arbutifolia (L.). Red Chokeberry.

Mespilus arbutifolia Linnæus, Sp. Pl. 478. 1753 [Virginia].

Pyrus arbutifolia var. *erythrocarpa* Willis 22.

Pyrus arbutifolia Knieskern 14.—Britton 99.

Aronia arbutifolia Barton, Fl. Phila. I. 227. 1818.

Swamps and damp thickets; frequent throughout the State.

Fl.—Late April to late May. *Fr.*—Early September to early October, persisting through autumn.

Middle District.—Farmingdale (S), New Egypt, Fish House, Kaighns Pt., Center Square, Washington Park, Tomlin, Mickleton, Medford (S), Wenonah, Clementon, West of Bridgeton (S), Dividing Creek.

Pine Barrens.—Bear Swamp (S), Atco, Pancoast (S), Hammonton (S), Tuckahoe (S).

Coast Strip.—Toms River, Seaside Park (S), Forked River, Waretown, Coxe's, Surf City (L), Palermo (S), Manahawkin.

Cape May.—Goshen (S), Bennett, Dias Creek (S), Green Creek (S), Cape May (S).

Aronia atropurpurea Britton. Purple-fruited Chokeberry.

Aronia atropurpurea Britton, Man. 517. 1901 [Arlington, Staten Isl.].

Rather less frequent than the preceding, occurring in the Middle, Coast and Cape May districts, but not yet detected elsewhere.

Fl.—Late April to late May. *Fr.*—Early August to early September, persisting through the autumn.

Middle District.—New Egypt, Westmont (S), Washington Park (S), Tomlin, Millville.

Coast Strip.—Pt. Pleasant, Surf City (L), Holly Beach.

Cape May.—Court House (S), Bennett.

Aronia nigra (Willd.). Black Chokeberry.

Pl. LXVII., Fig. 1.

Pyrus arbutifolia var. *nigra* Willdenow, Sp. Pl. II. 1013. 1800 [Virginia].

Pyrus arbutifolia var. *melanocarpa* Knieskern 14.—Willis 22.

Aronia melanocarpa Barton Fl. Phila. I. 227. 1818.

Swamps and damp thickets; frequent throughout the State. While often quite equal to *A. arbutifolia* in size, this species is sometimes quite low, not larger than the Hog Huckleberry bushes, with which it often mingles, its black fruit resembling enormous huckleberries. Always distinguished from the two preceding by the smooth, not wooly, undersurface of the leaves.

Fl.—Late April to late May. *Fr.*—Early July to early August.

Middle District.—Shark River, New Egypt, Fish House, Kaighns Pt., W. Deptford, Springdale (S), Alloway.

Pine Barrens.—Toms River (S), Whitings, Browns Mills, Pleasant Mills, Egg Harbor City, Tuckahoe (S).

Coast Strip.—Peahala (L), Holly Beach (UP).

AMELANCHIER Medicus.

Amelanchier canadensis (L.). Service-berry.

Mespilus canadensis Linnæus, Sp. Pl. 478. 1753 [Virginia and Canada].

Amelanchier canadensis Knieskern 14.—Britton 100.

Frequent in dry open woods of the northern counties, but rare within our limits, occurring in the upper part of the Middle district along the Delaware.

Fl.—Early April to early May, appearing with the leaves.

Fr.—Mid-June to mid-July.

Middle District.—Bordentown.

Amelanchier intermedia Spach. Shad-bush.

Amelanchier intermedia Spach, Hist. Nat. Veget. II. 83. 1834 [North America].

Amelanchier canadensis var. *oblongifolia* Willis 22.

Amelanchier canadensis var. *obovalis* Britton 100.

Amelanchier botryapium Keller and Brown 180.

Frequent throughout the State in thickets and low damp woods. The shad-bushes give the first touch of bloom to the swamps of the coastal plain. Their spikes of white flowers and whitish leaf buds stand out in strong contrast to the somber brown tints that prevail until the general bursting of buds clothes everything with the misty gray-green of early spring, and by that time these pioneer flowers are ready to scatter their white petals like a belated flurry of snow. The bushes then become inconspicuous among the other green shrubbery.

Fl.—Early April to early May, appearing with the leaves.

Fr.—Mid-June to mid-July.

Middle District.—Farmingdale, Pt. Pleasant, Pemberton (NB), Merchantville, Lindenwold (S), Washington Park, Westville, Tomlin, Woodbury, Yorktown.

Pine Barrens.—Forked River, Woodmansie, Speedwell, Chatsworth, W. Plains, Browns Mills, Bear Swamp (S), Clementon (S), Cedar Brook, Landisville, Hammonton.

Coast Strip.—Cox's, Surf City (L), Ship Bottom (L), Beach Haven Crest (L), Barnegat City (L), Atlantic City (S), Ocean City, Palermo; Piermont (S), Stone Harbor, Cold Spring (OHB).

CRATÆGUS L.

Cratægus crus-galli L. Cockspur Thorn.

Cratægus crus-galli Linnæus, Sp. Pl. 476. 1753 [Virginia].—Barton Fl. Phila. I. 225. 1818.—Knieskern 14.—Britton 100.

Frequent in thickets of the northern counties and southward casually along the Delaware, also quite plentiful along the whole Coastal strip and up the larger rivers.

Fl.—Mid-May to early June. *Fr.*—October into November.

Middle District.—Bordentown (C), Pennsgrove (C), Salem (HB).

Coast Strip.—Holgate's (L), Coxe's, Barnegat (C), Absecon (S), Pleasant Mills, Mo. of Batsto, Ocean City (S), Court House.

Cratægus pruinosa Wendl. Scarlet Thorn.

Mespilus pruinosa Wendl., Flora V: 701. 1823 [North America].—Knieskern 14.—Britton 99.

Frequent in thickets of the northern counties and in the upper part of the Middle district, also reported from Mays Landing in Britton's Catalogue under the specific name *coccinea*. Such specimens as have been examined from our district seem nearest to *pruinosa*.

Fl.—Mid-May to early June. *Fr.*—October into November.

Middle District.—Matawan (C), Arnetown (C), Farmingdale, Mullica Hill (H), Mantua (H), New Egypt.

Cratægus tomentosa L.* Dwarf Thorn.

Cratægus tomentosa Linnæus, Sp. Pl. 476. 1753 [Virginia].

Cratægus uniflora Knieskern 14.—Keller and Brown 191.

Cratægus parviflora Pursh Fl. Am. Sept. I. 338. 1814.—Willis 22. Britton 100.

* Another species is given by Britton as occurring at Pemberton and Keyport which is called *C. tomentosus*, using the name in its former significance. Just what these are I cannot say, as no specimens are extant.

Common in the Middle, Pine Barren and Cape May districts and at a few stations in the northern part of the State, but mainly within the coastal plain.

This is the common thorn-bush of the coastal plain region.

Fl.—Mid-May to early June. *Fr.*—September into October.

Middle District.—Pt. Pleasant, New Egypt, Florence Hts., Moorestown, Medford (S), Locust Grove (S), Washington Park, National Park, Red Bank, Griffith's Swamp, Fairton (S), Newfield, Centerton (S).

Pine Barrens.—Atco, Berlin, Cedar Brook, Forked River, Speedwell, Quaker Bridge, Forked River, Toms River, Hammonton, Folsom.

Cape May.—Cold Spring, Bennett, N. England Creek.

***Cratægus pausiaca* Ashe. Pennsylvania Thorn.**

Cratægus pausiaca Ashe, Ann. Carnegie Mus. I: 390. 1902. [Alleghany Co., Pa.].

Probably common northward, but known from our range only at Red Bank, Gloucester County.

Fl.—Mid-May to early June. *Fr.*—October into November.

Middle District.—Red Bank.

Family DRUPACEÆ. Peaches, Plums and Cherries.

Key to the Species.

- a. Outer covering of fruit velvety. [*Amygdalus persica*]*
- aa. Outer covering of fruit glabrous.
 - b. Flowers in umbels or fascicles expanding with or before the leaves.
 - c. Fruit, large, stone flattened.
 - d. Leaves abruptly acuminate. *Prunus americana*, p. 491
 - dd. Leaves gradually acuminate.
 - e. Leaves glabrous when mature. *P. angustifolia*, p. 491
 - cc. Leaves pubescent below when mature. *P. maritima*, p. 491
 - cc. Fruit smaller, stone globose.
 - d. Leaves glabrous, pedicels short, fruit sour. [*P. cerasus*]†
 - dd. Leaves pubescent beneath, pedicels long, fruit sweet. [*P. avium*]‡
 - bb. Flowers in racemes terminating branches of the season, stones globose. *P. serotina*, p. 492

* Peach Tree, occasionally escaping from cultivation.

† Sour Cherry, occasionally escaping.

‡ Sweet Cherry, frequently escaping.

PRUNUS L.

Prunus americana Marsh. Wild Plum.

Prunus americana Marshall, Arb. Am. III. 1785 [Eastern U. S.].—Knieskern 13.—Willis 19.—Britton 91.

Thickets, usually along streams; frequent in the northern counties; occasional southward in the Middle district.

Fl.—Late April to mid-May, before or with the leaves.

Middle District.—New Egypt, Pensauken (S), Kaighns Pt., Albion, Mullica Hill, Mickleton, Swedesboro, Yorktown, Bridgeton.

Prunus angustifolia Marsh. Chickasaw Plum.

Prunus angustifolia Marshall, Arb. Am. III. 1785 [Southern States].—Keller and Brown 192.

Prunus Chicasa Britton 91.

This southern species was discovered by Mr. Albert Commons on the banks of the Delaware River in loose drifting sands, three miles south of Pennsgrove, in Salem County. Dr. Britton regards it as "adventive from the southwest" in his Catalogue, but as the species is now known to occur native from Delaware to Florida and Texas, its presence here would seem to be quite natural and in line with the distribution of several other Austro-riparian species.

Middle District.—Penns Grove (NB).

Prunus maritima Wang. Beach Plum.

Prunus maritima Wangenheim, Am. 103. 1781 [Long Island, N. Y.].—Pursh, Fl. Am. Sept. I. 332. 1814.—Knieskern 13.—Willis 19.—Britton 91.—Keller and Brown 192.

Most plentiful along the dunes and sands of the Coastal strip; occasional in the Pine Barrens, usually along the tide water streams, and locally on sandy ground in the Middle district. Not recorded in New Jersey north of our limits.

This is the most common wild plum of southern New Jersey, and its fruit, though not as fine as the larger *P. americana*, is well flavored. The bushes average about three feet in height, and sometimes form thickets of considerable size, as about Cape May Point. In early spring the feathery white blossoms appear before the leaves, but the spikes are not so showy as the purer white blossoms of the Chokeberry and Shad-bush.

Fl.—Late April to early May, before or with the leaves. *Fr.*
—Early September to early October.

Middle District.—New Egypt, Brown's Mills, Pemberton Jnc. (S), Medford, Clementon, Cains Mill.

Pine Barrens.—Deal (UP), Pleasant Mills, Hammonton (C), Folsom (T).

Coast Strip.—Sandy Hook, Pt. Pleasant (S), Toms River (S), Seaside Park, Waretown, Barnegat City (L), Beach Haven Terrace (L), Surf City (L), Atlantic City, Wildwood, Cape May Pt. (S).

• ***Prunus serotina* Ehrh. Wild Cherry.**

Prunus serotina Ehrhart, Beitr. III. 20. 1788 [North America].—Barton, Fl. Phila. I. 222. 1818.—Knieskern 13.—Britton 91.

Common in woods and thickets and along fence rows in the Northern, Middle, Coast and Cape May districts. In the Pine Barrens it occurs only as an occasional introduction in localities long cleared and cultivated.

The Wild Cherry is one of the most characteristic trees of the coastal strip, and both it and the Red Cedar are sure to appear wherever we leave the Pine Barrens.

Fl.—Mid-May to early June, when the leaves are well expanded. *Fr.*—Late July to late August.

Middle District.—Navesink Highlands (UP), Pt. Pleasant, New Egypt, Fish House, Delaire, Medford (S), Albion, Washington Park, Mickleton, Glassboro, Centerton (S).

Pine Barrens.—Landisville (probably introduced).

Coast Strip.—Sandy Hook, Toms River (UP), Surf City (L), Beach Haven Terrace (L), Barnegat City (L), Absecon (Bassett), Atlantic City (S), Ocean City (S), Five-Mile Beach, Stone Harbor.

Cape May.—Bennett, Cape May Ct. House.

Family CAESALPINIACEÆ. Senna, etc.

Key to the Species.

- a. Tree with cordate orbicular leaves and pink papilionaceous flowers, sessile on the branches, appearing before the leaves. *Cercis canadensis*, p. 493
- aa. Herbs with pinnate leaves and yellow papilionaceous flowers.
 - b. Leaflets linear, 6–20 mm. long.
 - c. Flowers 4–8 mm. broad, anthers 5. *Cassia nictitans*, p. 493
 - cc. Flowers 25–40 mm. broad, anthers 10. *C. chamæcrista*, p. 493
 - bb. Leaflets ovate, 20–50 mm. long. *C. marilandica*, p. 494

CERCIS L.***Cercis canadensis* L. Red-bud. Judas Tree.***Cercis canadensis* Linnæus, Sp. Pl. 374. 1753 [Virginia].—Britton 90.

Rich woods, usually on hills bordering rivers. Locally on the upper Delaware, and at Rocky Hill on the upper Raritan, according to Britton's Catalogue. Known within our limits only from records at Bordentown (H. C. Stokes), and between Camden and Gloucester (C. F. Parker). These New Jersey stations constitute the northern limit of the species east of the Alleghanies.

Fl.—Late April to mid-May.*Middle District.*—Bordentown (C), Between Camden and Gloucester (P).**CASSIA L.*****Cassia nictitans* L. Sensitive Pea.***Cassia nictitans* Linnæus, Sp. Pl. 380. 1753 [Virginia].—Knieskern 13.—Britton 90.

Open sandy ground; locally in the northern part of the State and common throughout the southern portion, except in the Pine Barrens, where it seems to have intruded from West Jersey.

This is a characteristic plant of the Middle district, but with a strong tendency to become a weed, spreading over railroad embankments and in cultivated ground.

Fl.—Late July to mid-September. *Fr.*—Early September to late October.*Middle District.*—New Egypt, Medford (S), Blackwood, Fish House, Washington Park, Mickleton.*Pine Barrens.*—Landisville (probably as weed), Malaga (P).*Coast Strip.*—Barnegat City Inc. (L), Ocean City (S), Cold Spring.***Cassia chamæcrista* L. Large-flowered Sensitive Pea.***Cassia Chamæcrista* Linnæus, Sp. Pl. 379. 1753 [Jamaica, Barbadoes and Virginia].—Knieskern 13.—Britton 90.

Distribution and abundance as in the last, of which it is essentially a larger edition.

The foliage is similar, but the very much larger flowers make it a much more conspicuous plant.

Fl.—Late July to mid-September. *Fr.*—Early September to late October.

Middle District.—New Egypt, Medford (S), Birmingham, Mickleton, Bridgeport, Paulsboro.

Coast Strip.—Asbury Park (P), Atlantic City (S), Absecon, Piermont, Anglesea, Holly Beach, Mays Landing (T).

Cape May.—Court House, Cold Spring (S), Bennett, Cape May.

***Cassia marilandica* L. Wild Senna.**

Cassia Marilandica Linnæus, Sp. Pl. 378. 1753 [Virginia and Maryland].—Knieskern 13.—Willis 19.—Britton 90.

Frequent in open swamps in the northern counties and southward locally in the Middle and Coast districts to Cape May.

Fl.—Early July to late August. *Fr.*—Late September to late October.

Middle District.—Freehold (C), Cookstown, Florence, Bordentown, Delair, Lindenwold (S), Cooper's Creek, Camden, Bridgeport, Bridgeboro (C).

Coast Strip.—Tuckerton, Beesley's Pt. (S).

Cape May.—Cold Spring (OHB).

Family PAPILIONACEÆ. Peas, Beans, etc.

Key to the Species.

a. Climbing or trailing vines.

b. Leaves pinnate, with 5-7 leaflets, flowers brownish purple.

Apios apios, p. 512

bb. Leaves 3-foliate.

c. Flowers large, 25-50 mm. long.

d. Corolla violet, plant finely rough-pubescent.

Bradburya virginica, p. 510

dd. Corolla very pale blue, plant glabrous.

Clitoria mariana, p. 511

cc. Flowers less than 20 mm. long.

d. Few on the end of a very long peduncle.

e. Leaflets mainly lobed, 20-50 mm. long. Pod 5-8 cm. long.

Strophostyles helvula, p. 513

ee. Leaflets mainly entire, 10-40 mm. long. Pod 2-5 cm. long.

S. umbellata, p. 514

dd. Numerous, not clustered at the end of a long peduncle.

e. Leaves broadly ovate, or rhombic ovate.

f. Flowers white or violet tinted, in short axillary racemes or clusters.

g. Leaflets 25-80 mm. long, plant glabrous or slightly pubescent.

Falcata comosa, p. 511

gg. Leaflets often 100 mm. long, plant villose, brown-pubescent.

F. pitcheri, p. 512

ff. Flowers purple in long, slender axillary racemes, leaves 50-100 mm. long, plant finely pubescent.

Phaseolus, p. 513

ee. Leaves elliptic or oval, 20-40 mm. long, flowers purplish.

f. Nearly glabrous. *Galactia regularis*, p. 512

ff. Finely downy pubescent. *G. volubilis*, p. 513

aa. Herbs with pinnate leaves terminating in a tendril.

b. Flowers 10-50 mm. long.

c. Stipules foliaceous, seashore plant. *Lathyrus maritimus*, p. 510

cc. Stipules half sagittate, inland plants. *L. myrtifolius*, p. 510

bb. Flowers 8-13 mm., stipules linear, long auriculate.

[*Vicia tetrasperma*]¹

aaa. Herbs or trees, leaves without terminal tendrils.

b. Leaves digitate, usually 8-10 leaflets, flowers in erect spikes, blue.

Lupinus perennis, p. 497

bb. Leaves pinnate, leaflets numerous.

c. Leaflets less than 12 mm. long, about 4 mm. wide, flowers yellow. *Aeschynomene*, p. 498

cc. Leaflets 25 mm. or more long.

d. Plant an herb, villose, with silky white hairs, flowers pink and white. *Cracca virginiana*, p. 498

dd. Plant a shrub, with bristly stems, flowers red purple.

[*Robina hispida*]²

ddd. Plant a tree, with glabrous twigs and white flowers.

[*Pseudacacia*]³

bbb. Leaves 3-foliolate. Herbs, erect or trailing.

c. Leaflets entire.

d. Flowers yellow.

e. Leaflets obovate, plant glabrous, succulent, 6-12 dm. high, in round masses, flowers pale yellow.

Baptisia tinctoria, p. 496

ee. Leaflets linear lanceolate, plant usually pubescent, 1.5-6 dm. high, flowers deep orange.

Stylosanthes biflora, p. 499

dd. Flowers pink or pink and white.

e. Pod 1-2 jointed, not covered by minute hooked hairs.

Lespedeza, p. 505

ee. Pod several to many jointed, covered by minute hooked hairs.

Meibomia, p. 499

cc. Leaflets minutely toothed (entire in *Trifolium pratense*).

d. Flowers in slender spike-like racemes.

e. Flowers yellow. [*Melilotus officinalis*]⁴

ee. Flowers white. [*M. alba*]⁶

¹ Wild Vetch. Fields and roadsides, an occasional weed.

² Clammy Locust. Established in sandy ground at several localities.

³ Locust Tree. Apparently not native in our region, but frequently introduced about houses and occasionally escaped.

⁴ Yellow Melilot. Waste ground.

⁶ White Melilot. Waste ground.

dd. Flowers in dense heads or very short racemes.

c. Flowers bluish purple. [*Medicago sativa*]⁷

ce. Flowers yellow.

f. Calyx densely pubescent. [*M. lupulina*]⁸

ff. Calyx glabrous.

g. Corolla striate, sulcate in age.

h. Leaflets all sessile.

[*Trifolium aureum*]⁹

hh. Terminal leaflet stalked.

[*T. procumbens*]¹⁰

gg. Corolla not striate.

[*T. dubium*]¹¹

eee. Flowers white or tinged with pink.

f. Creeping, stoloniferous.

[*T. repens*]¹²

ff. Erect or procumbent, not stoloniferous.

[*T. hybridum*]¹³

eeee. Flowers pink, leaves with light spots above.

[*T. pratense*]¹⁴

eeeee. Flowers covered by the gray silky plumes of the calyx, forming a dense silky head. [*T. arvense*]¹⁵

bbbb. Leaves simple, lanceolate, flowers yellow.

Crotalaria sagittalis, p. 497

BAPTISIA Ventenat.

Baptisia tinctoria (L.). Wild Indigo.

Pl. LXVIII., Fig. 1.

Sophora tinctoria Linnæus, Sp. Pl. 373. 1753 [Barbadoes and Virginia].

Baptisia tinctoria Knieskern 13.—Britton 80.

Dry sandy soil throughout the State, especially in open woods and clearings; most plentiful in the Middle district.

The Wild Indigo is a characteristic plant over most of the coastal plain region, forming large, round pillow-like tufts, two or three feet high and of equal diameter; conspicuous with its yellow flowers and glaucous-green foliage, the latter turning black when dried.

⁷ Alfalfa. Escaped from cultivation or along railroad banks.

⁸ Nonesuch. Waste ground, resembling yellow clover.

⁹ Yellow Clover, Hop Clover. The clovers are entirely weeds except the white, red and the crimson flowered *T. incarnatum*, which are cultivated, the first two escaping everywhere.

¹⁰ Low Hop Clover.

¹¹ Least Hop Clover.

¹² White Clover.

¹³ Alsatian Clover.

¹⁴ Red Clover. Pl. LXXI.

¹⁵ Rabbit-foot Clover.

Fl.—Late June to late July. *Fr.*—Early August to early September.

Middle District.—Shark River, Farmingdale, Pt. Pleasant (S), New Egypt, Arney's Mt. (S), Camden (P), Locust Grove (S), Lawnside, Albion, Sicklerville (S), Dividing Creek.

Pine Barrens.—Forked River, Landisville, Winslow, Folsom, Hammonton.

Cape May.—Bennett (S), Cape May (P).

CROTALARIA L.

Crotalaria sagittalis L. Rattle-box.

Crotalaria sagittalis Linnæus, Sp. Pl. 714. 1753 [Brazil and Virginia].—Barton, Fl. Phila. II. 71. 1818.—Knieskern 12.—Britton 80.

Locally in sandy fields in the northern counties and frequent in the Middle and Cape May districts. Also becoming a good deal of a weed and spreading into the Pine Barrens along railroads, etc.

F.—Late June to late August. *Fr.*—Late July to late September.

Middle District.—Marlboro, Hornerstown, Camden, Medford (S), Mickleton, Tomlin, Fairton.

Pine Barrens.—Winslow (S), Richland (T), Malaga (P).

Cape May.—Cold Spring (OHB).

LUPINUS L.

Lupinus perennis L. Wild Lupine.

Pl. XXXVII., Fig. 2.

Pl. LXIX.

Lupinus perennis Linnæus, Sp. Pl. 721. 1753 [Virginia].—Barton, Fl. Phila. II. 71. 1818.—Britton 80.—Keller and Brown 195.

Open sandy ground and along the edges of woods; occurs at a few stations in the northern counties, but mainly a plant of the coastal plain and most plentiful in the Middle district, though it is found also in the Pine Barren and Cape May districts.

The Lupine is one of the most conspicuous spring flowers of West Jersey. It sometimes grows in large beds, its "wheel-shaped" leaves closely intermingled, and forming a fine setting for the brilliant spikes of purplish-blue flowers, the whole color scheme being almost a duplicate of the beds of birdfoot violets that flourish in similar locations a little earlier in the season.

As in the violet, too, we sometimes find flowers of a lilac hue, the form "*rosea*" of Britton's Catalogue.

Fl.—Early May to early June. *Fr.*—Early June to early July.

Middle District.—Farmingdale, New Egypt, Bordentown, Burlington, Browns Mills, Birmingham, Camden, Washington Park, Mickleton, Glassboro (S), Millville (S).

Pine Barrens.—Clementon, Cedar Brook, Inskip, Landisville, Folsom, Mays Landing (NB), Tuckahoe.

Cape May.—Seaville (S).

CRACCA L.

Cracca virginiana L. Goat's Rue. Cat-gut.

Cracca virginiana, Linnæus, Sp. Pl. 752. 1753 [Virginia and Canada].

Tephrosia virginiana Barton, Fl. Phila. II. 84. 1818.—Knieskern 12.—Britton 82.

Open sandy ground and edges of woods; apparently more widely distributed in the northern counties, but within our limits an exact counterpart of the Lupine in distribution and abundance, often growing in close association with it. Its pink and yellow flowers are quite as handsome individually, but are not so conspicuous as the blue standards of the Lupine.

Fl.—Early June to early July. *Fr.*—Early August to early September.

Middle District.—Shark River, New Egypt, Locust Grove, Lindenwold, Clementon (S), Albion, Sicklerville (S), Lawnside (S), Gloucester Pt., Sewell (S), Glassboro (S), Mickleton, Swedesboro.

Pine Barrens.—Allaire (S), Forked River, E. and W. Plains, Whitings, Lakehurst, Tabernacle, Cedar Brook, Williamstown Jnc., Winslow Jnc., Landisville, Egg Harbor City.

Cape May.—Court House (OHB), Cape May (OHB).

AESCHYNOMENE L.

Aeschynomene virginica (L.). Sensitive Joint Vetch.

Hedysarum Virginicum Linnæus, Sp. Pl. 750. 1753 [Virginia].

Aeschynomene hispida Barton, Fl. Phila. II. 80. 1818.

Aeschynomene Virginica Britton 83.—Keller and Brown 199.

A southern plant which follows up the shore of the lower Delaware River, occurring locally as far as Bridgeport, formerly to Kaighns Pt., Camden, according to Barton.

Fl. and *Fr.*—August and September at least.

Middle District.—Kaighns Pt. (C), Center Square (KB), Bridgeport (H), Swedesboro, Salem (NB).

STYLOSANTHES Swartz.

Stylosanthes biflora (L.). Pencil-flower.

Pl. LXVIII., Fig. 2.

Trifolium biflora Linnæus Sp. Pl. 773. 1753 [Virginia and Canada].

Stylosanthes elatior Barton Fl. Phila. II. 75. 1818.—Britton 84.

Open sandy ground, edges of woods, etc.; occasional in the northern counties, but most common on the coastal plain, especially in the Middle district, though it occurs also in the Pine Barrens and Cape May peninsula.

Fl.—Mid-June to mid-September. *Fr.*—Early August to early October.

Middle District.—Farmingdale, Prospertown, Burlington, Florence Heights, Riverton, Poke Hill (NB), Camden, Woodbury, Lindenwold, Swedesboro, Mickleton (NB), Husted (S), Fairton (S).

Pine Barrens.—Berlin, Quaker Bridge (S), Newtonville, Egg Harbor City, Mays Landing (S), Tuckahoe (S).

Cape May.—Cold Spring.

MEIBOMIA Adanson.

a. Pod not indented along the upper edge, but deeply constricted or notched from the lower edge; raised on a slender pedicel from the calyx.

b. Flower panicle arising independently from the base of the plant.

Meibomia nudiflora, p. 500

bb. Flower panicle terminal.

c. Leaves crowded at its base.

M. grandiflora, p. 500

cc. Leaves scattered along the stem.

M. pauciflora, p. 501

aa. Pod constricted on both margins, more deeply below.

b. Plant trailing, leaflets orbicular.

M. michauxii, p. 501

bb. Plant not trailing.

c. Leaves sessile or nearly so, leaflets linear or lanceolate, 20–80 mm. long.

M. sessilifolia, p. 501

cc. Leaves petioled.

d. Leaflets narrowly linear.

M. stricta, p. 501

dd. Leaflets broader.

e. Joints of the pods decidedly longer than broad.

f. Leaflets obtuse, rough, yellowish green.

M. canescens, p. 502

ff. Leaflets acuminate, glabrous, glaucous beneath.

M. bracteosa, p. 502

ee. Joints but little longer than broad.

f. Pod distinctly raised in the calyx on a short stalk.

- g. Plants glabrous.
 - h. Leaflets lanceolate. *M. paniculata*, p. 502
 - hh. Leaflets ovate or oval, glaucous beneath. *M. laevigata*, p. 503
- gg. Plants pubescent.
 - h. Leaflets velvety-pubescent beneath. *M. viridiflora*, p. 503
 - hh. Leaflets appressed-pubescent beneath. *M. dillenii*, p. 503
- ff. Pod sessile in the calyx or practically so, segments short and rounded.
 - g. Segments 4-7, flowers showy. *M. canadensis*, p. 504
 - gg. Segments 1-3, flowers small.
 - h. Leaflets scabrous, 20-50 mm. long. *M. rigida*, p. 504
 - hh. Leaflets not scabrous, 10-20 mm. long.
 - i. Plant nearly glabrous. *M. marilandica*, p. 505
 - ii. Plant with stem pubescent. *M. obtusa*, p. 505

MEIBOMIA Heister.

Meibomia nudiflora (L.). Naked-flowered Tick-trefoil.

Hedysarum nudiflorum Linnæus, Sp. Pl. 749. 1753 [Virginia].

Desmodium nudiflorum Knieskern 12.—Britton 84.

Common in dry woods of the northern counties and less frequent southward in the Middle district and on the Cape May peninsula.

Fl.—Early July to late September. *Fr.*—Mid-August to early October.

Middle District.—New Egypt, Arney's Mt. (S), Middletown (Kn), Locust Grove (S), Haddonfield (S), Oaklyn (S), Camden (P), Tomlin (S), Mickleton (H), Swedesboro, Bridgeton.

Cape May.—Court House (S), Bennett, Cape May (OHB).

Meibomia grandiflora (Walt.). Pointed-leaved Tick-trefoil.

Hedysarum grandiflora Walter Fl. Car. 185. 1788 [S. Carolina].

Desmodium grandiflorum Britton 84.

Dry woods; common in the northern counties, less common in the Middle district, becoming rare within our limits.

Fl.—Early July to late July. *Fr.*—Early August to late September.

Middle District.—Farmingdale, New Egypt, Swedesboro.

Meibomia pauciflora (Nutt.). **Few-flowered Tick-trefoil.**

Hedysarum pauciflorum Nuttall, Gen. 2: 109. 1818 [Ohio and Kentucky].

Rare in the Middle district, only known from New Egypt, where it was collected by Mr. J. H. Grove, July 24, 1906.

Flowers and immature fruit July 24.

Middle District.—New Egypt.

Meibomia michauxii Vail. **Trailing Tick-trefoil.**

Meibomia Michauxii Vail, Bull. Torr. Bot. Club XXIII. 140. 1896, n. n. for

Hedysarum rotundifolium Mich. (nee Vahl) [Carolina].

Desmodium rotundifolium Knieskern 12.—Willis 18.—Britton 84.

Frequent in the dry woods of the northern counties, occasional southward in the Middle, Pine Barren and Cape May districts. Our only trailing species.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—New Egypt, Sicklerville, Mickleton (C), Swedesboro.

Pine Barrens.—Pen Bryn (S), Ancora, Absecon, Landisville.

Cape May.—Goshen (S).

Meibomia sessilifolia (Torr.). **Sessile-leaved Tick-trefoil.**

Hedysarum sessilifolium Torrey in Curtis Bost. Jour. N. H. I. 122, 1834 [Wil-
mington, N. C.].

Sandy, open ground at Hammonton, where it was first collected by the writer on September 13, 1903. The only known locality in the State and the northern limit of the species, except the lower Susquehanna Valley in Pennsylvania.

Pine Barrens.—Hammonton.

Meibomia stricta (Pursh.). **Stiff Tick-trefoil.**

Hedysarum strictum Pursh, Fl. Am. Sept. 483, 1814 [Pine woods, N. J.].—
Nuttall Gen. II. 109. 1818.—Barton Fl. Phila. II. 79. 1818.

Desmodium strictum Knieskern 12.—Willis 18.—Britton 85.

Meibomia stricta Keller and Brown 200.

Dry sandy woods; rather rare and local and mainly confined to the Pine Barrens, although it occurs sporadically in West Jersey. This region constitutes its northern limit. This is one of the most distinctive Pine Barren species of *Meibomia*, easily recognized by its very slender leaves, small flowers and few segments to the pods. It grows in abundance along the roads, running parallel to the Egg Harbor River, below Mays Landing.

Fl.—Late July to early September. *Fr.*—Late August and early October (both approximate).

Middle District.—Ashland, Mullica Hill, Woodbury (C), Bridgeton (NB).

Pine Barrens.—Malaga (S), Hospitality Branch (T), Quaker Bridge (S), Mays Landing (S), Manumuskin (S).

***Meibomia canescens* (L.). Hoary Tick-trefoil.**

Hedysarum canescens Linnæus, Sp. Pl. 748. 1753 [Virginia and Jamaica].

Desmodium canescens Britton 84.

Dry ground; not very common. A few stations in the northern counties, and within our limits confined to the Middle district and lower part of the Cape May peninsula.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—Pemberton Jnc., Medford (S), Fish House, Delair, Gloucester (P), Swedesboro, Salem (S).

Cape May.—Cold Spring (OHB).

***Meibomia bracteosa* (Michx.). Large-bracted Tick-trefoil.**

Hedysarum bracteosa Michaux, Fl. Bor. Am. II. 73. 1803 [Virginia and Carolina Mts.].

Desmodium cuspidatum Britton 85.

Meibomia bracteosa Keller and Brown, 200.

Thickets and wood edges; rather common in the northern counties, but very rare within our limits.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—Mickleton (C), Swedesboro.

***Meibomia paniculata* (L.). Panicked Tick-trefoil.**

Hedysarum paniculata Linnæus, Sp. Pl. 749. 1753 [Virginia].

Desmodium paniculatum Knieskern 12.—Britton 85.

Meibomia paniculata Keller and Brown 200.

Common in dry woods throughout the State, except in the Pine Barrens, where it occurs only in the vicinity of the larger streams which it has followed up in company with other species of the Coastal strip.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—New Egypt, Vincentown (NB), Hartford, Camden (P), Medford, Springdale (S), Locust Grove (S), Tomlin, Swedesboro, Dividing Creek.

Coast Strip.—Ocean Grove (P), Atlantic City (S), Ocean City, Mays Landing (S), Five-Mile Beach.

Cape May.—Bennett, Cold Spring (S).

***Meibomia lævigata* (Nutt.). Smooth Tick-trefoil.**

Hedysarum lævigatum Nuttall Gen. II. 109. 1818 [Forest of N. J.].

Desmodium lævigatum Knieskern 12.—Willis 18.—Britton 85.

Meibomia lævigata Keller and Brown 200.

Dry sandy woods; confined to the Middle and Cape May districts, not very common, does not seem to occur north of the coastal plain to any extent.

Fl.—Early August to early September. *Fr.*—Early September to early October.

Middle District.—Ocean Co. (Kn), Crosswicks, Medford (S), Tomlin, Mickleton, Swedesboro.

Cape May.—Dennisville (S).

***Meibomia viridiflora* (L.). Velvet-leaved Tick-trefoil.**

Hedysarum viridiflorum Linnæus, Sp. Pl. 748. 1753 [Virginia].—Pursh, Fl. Am. Sept. II. 482.

Desmodium viridiflorum Britton 85.

Meibomia viridiflora Keller and Brown 200.

Dry sandy thickets and edges of woods; practically restricted to the Middle district, and apparently does not range north of the coastal plain in New Jersey. Nowhere common. Easily recognized by its large leaves, densely velvety pubescent beneath.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—Hainesport, Vincentown (NB), Spring Garden (C), Medford (S), Locust Grove (S), Tomlinson's (NB), Mickleton (H), Yorktown, Millville.*

Pine Barrens.—Landisville,

***Meibomia dillenii* Darl. Dillen's Tick-trefoil.**

Desmodium Dillenii Darlington, Fl. Cestr. 414. 1837 [Chester Co., Pa.].—Knieskern 12.—Willis 18.—Britton 85.

* The record for Swedesboro (KB) proves to be *M. dillenii*.

Open woods and thickets; more or less common throughout the State, least abundant in the Pine Barrens, where it may be a recent intrusion. Not yet reported from Cape May.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—New Egypt, Fish House (S), Riverton, Medford (S), Swedesboro.

Pine Barrens.—Four miles east Hammonton (S), Landisville.

Coast Strip.—Five-Mile Beach (OHB).

***Meibomia canadensis* (L.). Showy Tick-trefoil.**

Hedysarum canadense Linnaeus, Sp. Pl. 748. 1753 [Virginia and Canada].

Desmodium Canadense Knieskern 12.—Britton 85.

Common along the borders of swamps and streams in the northern counties, but largely a weed in our limits. If native at all, only in the upper part of the Middle district, especially along the Delaware River, elsewhere generally found along railroad embankments.

Fl.—Mid-June to late August, and occasionally during autumn. *Fr.*—Mid-July to late September.

Middle District.—Bordentown (P), New Egypt, Pemberton Inc. (S), Ashland, Washington Park.

Pine Barrens.—Landisville (T), Woodbine (both apparently introduced along railroads).

Coast Strip.—Manahawkin.

***Meibomia rigida* (Ell.). Rigid Tick-trefoil.**

Hedysarum rigidum Elliot, Bot. S. C. and Ga. II. 215. 1824 [S. Carolina].

Desmodium rigidum Britton 86.

Meibomia rigida Keller and Brown 201.

Dry sandy woods; a few stations in the northern counties, but most plentiful in the southern part of the State, especially in the Pine Barrens.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—Springdale (S), Lawnsdale (S), Woodbury.

Pine Barrens.—Manahawkin, Quaker Bridge (S), Pen Bryn (S), Albion, Hammonton, Mays Landing (S), Weymouth (T), Egg Harbor City, Woodbine, Tuckahoe (S).

Cape May.—Dias Creek (S), Bennett, Cape May (OHB).

Meibomia marylandica (L.). Smooth Small-leaved Tick-trefoil.

Hedysarum marilandicum Linnæus, Sp. Pl. 748. 1753 [Carolina and Virginia].

Desmodium marylandicum Knieskern 12.—Britton 86.

Dry sandy woods throughout our region and at a few stations in the northern counties.

Fl.—Early August to early September. *Fr.*—Early September to early October.

Middle District.—Lawnside (S), Washington Park (S), Swedesboro.

Pine Barrens.—Manahawkin, Landisville, Egg Harbor City.

Cape May.—Dennisville (S), Cold Spring (OHB), Bennett.

Meibomia obtusa (Muhl.). Hairy Small-leaved Tick-trefoil.

Hedysarum obtusum Muhlenberg in Willdenow, Sp. Pl. III. 1190. 1803 [Pennsylvania].

Hedysarum ciliare Nuttall, Gen. II. 109. 1818.—Barton, Fl. Phila. II. 79. 1818.

Desmodium ciliare Knieskern 12.—Willis 18.—Britton 86.

Distribution exactly as in the last, but apparently the more common of the two. They really seem to be little more than glabrous and pubescent forms of the same thing. These two small, round, leaved *Meibomias*, with *M. rigida*, are the most generally distributed species in the Pine Barrens.

Fl.—Late July to early September. *Fr.*—Late August to early October.

Middle District.—New Egypt, Medford, Griffith's Swamp, Clementon, Tomlin (S), Mickleton, Dividing Creek (S).

Pine Barrens.—Albion, Landisville (T), Eighth St. (T), E. of Hammonton (S), Quaker Bridge (S), Mays Landing (S), Woodbine, Tuckahoe (S).

Cape May.—Bennett (S), Cape May, Cape May Pt.

LESPEDEZA Michaux.

a. Stipules subulate, calyx lobes narrow.

b. Small, apetalous, pistillate flowers, in addition to the usual larger violet purple blossoms, the former in small sessile clusters, or the two kinds intermingled.

c. Petaliferous flowers 1-6, on filiform peduncles, usually 2-4 times as long as the subtending leaves.

d. Stem trailing, downy, with short, spreading hairs.

Lespedeza procumbens, p. 506

dd. Stem glabrate or slightly appressed—pubescent.

e. Stems trailing, stipules 2-4.5 mm.

L. repens, p. 506

ee. Stems upright, stipules 5-8 mm.

L. violacea, p. 507

cc. Petaliferous flowers few or many, peduncles stouter, some of them shorter than the leaves.

- d.* Many of the peduncles elongated. *L. nuttallii*, p. 507
dd. Few, if any of them, exceeding the leaves.
e. Leaflets densely downy, pubescent. *L. stuvei*, p. 507
ee. Leaflets glabrate.
f. Leaflets linear or linear oblong. *L. virginica*, p. 508
ff. Leaflets oval or oblong. *L. frutescens*, p. 508
bb. Flowers all alike, in close heads, petals white or cream color, with a purple spot.
c. Leaflets oblong to orbicular.
d. Peduncles exceeding the leaves.
e. Leaflets oval or sub-orbicular. *L. hirta*, p. 508
ee. Leaflets narrowly oblong. *L. oblongifolia*, p. 509
dd. Peduncles shorter than the leaves. *L. capitata*, p. 509
cc. Leaflets linear or linear oblong. *L. angustifolia*, p. 509
aa. Stipules ovate, calyx lobes broad, a low annual. [*L. striata*]*

Lespedeza repens (L.). Creeping Bush-clover.

Hedysarum repens Linnaeus, Sp. Pl. 749. 1753 [Virginia].

Lespedeza repens Barton Fl. Phila. II. 77. 1818.—Knieskern 12.—Britton 86.

Dry sandy woods and banks; more or less common throughout the State, least so in the Pine Barrens.

Fl.—Early August to late September; sporadically during June and July. *Fr.*—Early September to mid-October.

Middle District.—New Egypt, Florence, Griffith's Swamp, Sicklerville, Mullica Hill, Swedesboro, Bridgeton.

Pine Barrens.—Whitings (S), Tuckahoe (S), Landisville.

Coast Strip.—Manahawkin, Somers Pt., Palermo, Ocean City (S).

Cape May.—Dennisville (S), Court House (S), Anglesea Inc. (S), Bennett, Cold Spring (OHB), Cape May (S).

Lespedeza procumbens Michx. Trailing Bush-clover.

Lespedeza procumbens Michaux, Fl. Bor. Am. II. 70. 1803 [Virginia and Carolina].—Barton Fl. Phila. II. 77. 1818.—Knieskern 12.—Britton 86.

Dry sandy woods and banks, not nearly so common as the preceding; apparently restricted to the Middle, Coast and Cape May districts.

These two trailing *Lespedezas* differ only in matter of pubescence, just as do the two *Meibomias* referred to above. Whether in these genera a difference of this sort is of specific value may be open to question.

Fl.—Early August to late September. *Fr.*—Early September to mid-October.

* Asiatic Bush-clover. Introduced at Wildwood, etc.

Middle District.—Tomlin.

Coast Strip.—Manahawkin.

Cape May.—Seaville (S), Bennett, Town Bank (OHB).

***Lespedeza nuttallii* Darl. Nuttall's Bush-clover.**

Lespedeza Nuttallii Darlington, Fl. Cestr. 420. 1837 [Mica Hills of Chester Co., Pa.].

Rather common in dry sandy ground in the Middle, Cape May and Coast districts, and possibly in the northern counties.

Fl.—Mid-August to mid-September. *Fr.*—Probably early September into October. Fruit apparently infrequent.

Middle District.—Lindenwold, Clementon.

Coast Strip.—Newtonville, Landisville, Mays Landing (S).

Cape May.—Dennisville (S), Seaville (S), Bennett (S), Cold Spring.

***Lespedeza violacea* (L.). Stalked Bush-clover.**

Hedysarum violacea Linnæus, Sp. Pl. 749. 1753 [Virginia].

Lespedeza violacea Britton 86.

A very scarce plant within our limits, if it occurs at all; possibly more abundant northward. Many of the references are based upon the preceding, and one specimen from Riddleton, although said to be upright, is so close to *L. repens* that I cannot satisfactorily separate it.

***Lespedeza stuvei* Nutt. Downy Bush-clover.**

Lespedeza Stuvei Nuttall, Gen. II. 107. 1818 [Sandy fields N. J.].—Willis 18.—Britton 86.

Sandy ground along the edges of woods and thickets; not very common, occurring in the Middle and Pine Barren districts. Reported also at several stations in the northern counties.

Full flower August 28, 1892, at Egg Harbor City.

Middle District.—Asbury Park (NB), Sea Girt (C).

Lawnside (S), Springdale (S).

Pine Barrens.—Forked River (McKenzie), Egg Harbor City, Tuckahoe (S), Spring Garden (C).

Cape May.—Bennett (S).

***Lespedeza stuvei neglecta* Britton. Narrow-leaved Downy Bush-clover.**

Lespedeza Stuvei neglecta Britton, Mem. Torr. Bot. Club V. 206. 1894. n. n. for *L. St. angustifolia* Britt. (nec Elliott) [New Jersey].—Keller and Brown 201.

Dry sandy ground in the lower Cape May peninsula. The plant might be quite as correctly regarded as a hairy form of *L. virginica*, so far as I can see.

Cape May.—Court House (S), Bennett.

***Lespedeza frutescens* (L.). Wand-like Bush-clover.**

Pl. LXX., Fig. 1.

Hedysarum frutescens Linnæus, Sp. Pl. 748. 1753 [Virginia].

Lespedeza reticulata Nutt. Gen. II. 107. 1818.—Britton 86.

Lespedeza sessiliflora Barton, Fl. Phila. II. 75. 1818.

Dry sandy ground of the coastal plain, common throughout our region and at a few stations just north of our limits.

Fl.—Mid-August to mid-September. *Fr.*—Early September to early October.

Middle District.—New Egypt, Locust Grove (S), Springdale (S), Orchard (S), Lindenwold (S), Washington Park (S), Swedesboro, Bridgeton.

Pine Barrens.—Jones Mill (S), Whiting's (S), Albion, Williamstown Jnc. (S), Cedar Brook, Malaga (S), Landisville, Pleasant Mills (S), Egg Harbor City, Mays Landing (S).

Coast Strip.—Manahawkin, Atlantic City (S).

Cape May.—Dennisville (S), Anglesea Jnc. (S), Bennett (S), Cape May (OHB).

***Lespedeza virginica* (L.). Slender Bush-clover.**

Medicago virginica Linnæus, Sp. Pl. 778. 1753 [Virginia].

Lespedeza reticulata var. *angustifolia* Britton 86.

Lespedeza virginica Keller and Brown 202.

Common throughout the State, except in the Pine Barrens, where it seems to be rare or lately introduced.

Fl.—Mid-August to mid-September. *Fr.*—Early September to early October.

Middle District.—Burlington, Birmingham (NB), Medford (S), Springdale (S), Oaklyn (S), Griffith's Swamp, Blackwood, Mullica Hill, Swedesboro, Dividing Creek.

Pine Barrens.—Newfield, Landisville, Tuckahoe (S).

Cape May.—Dennisville (S), Bennett, Cold Spring (S), Cape May Pt.

***Lespedeza hirta* (L.). Hairy Bush-clover.**

Pl. LXX., Fig. 2.

Hedysarum hirta Linnæus, Sp. Pl. 748. 1753 [Virginia].

Lespedeza hirta Knieskern 12.—Britton 87.

Dry sandy woods; several localities in the northern counties and common throughout our region.

Fl.—Mid-August to mid-September. *Fr.*—Early September to early October.

Middle District.—Medford (S), Griffith's Swamp, Washington Park (S), Tomlin.

Pine Barrens.—Forked River, Manchester (NB), Whitings, Clementon (S), Albion, Penbryn (S), Cedar Brook, Landisville, Hammonton, Egg Harbor City, Tuckahoe (S).

Coast Strip.—Waretown, Manahawkin, Atlantic City (S).

Cape May.—Bennett (S), Cape May (OHB).

***Lespedeza oblongifolia* (Britton). Brinton's Bush-clover.**

Lespedeza hirta oblongifolia Britton, Trans. N. Y. Acad. Sci. XII. 66. 1893 [Egg Harbor City, N. J.].

Restricted to the Pine Barren region; not common. The type specimen was collected by Dr. J. Bernard Brinton,* at Egg Harbor City, but there is a specimen in the herbarium of the Philadelphia Academy obtained in the Pines, September 4, 1832, by Torrey.

Fl.—Mid-August to mid-September. *Fr.*—Early September to early October.

Pine Barrens.—Jones Mill (S), Quaker Bridge, Bear Swamp (S), Egg Harbor City.

***Lespedeza capitata* Michx. Round-headed Bush-clover.**

Lespedeza capitata Michaux, Fl. Bor. Am. II. 71. 1803 [Virginia and Carolina].—Barton, Fl. Phila. II. 76. 1818.—Knieskern 12.—Keller and Brown 202.

Lespedeza frutescens Britton 87.

Dry soil; common throughout the State.

Fl.—Mid-August to mid-September. *Fr.*—Early September to early October.

Middle District.—Farmingdale (NB), New Egypt, Burlington (NB), Fish House (S), Delaire, Springdale (S), Orchard (S), Blackwood, Lawnside (S), Swedesboro.

Pine Barrens.—Buena Vista, Mays Landing (S), Tuckahoe (S).

Coast Strip.—Waretown, Manahawkin, Harvey Cedars (L), N. Beach Haven (L), Tucker's (L), Barrel Island (L), Ocean City (S), Palermo, Sea Isle Inc. (S), Piermont, Five-Mile Beach.

Cape May.—Cold Spring (S), Bennett, Cape May (OHB).

* 1835–1894. For a number of years the leader of the active field botanists of Philadelphia. Founder and president of the Philadelphia Botanical Club.

cf. Bull. Torrey Bot. Club XXII, pp. 93–97.

Lespedeza angustifolia (Pursh.). **Narrow-leaved Bush-clover.**

Lespedeza capitata var. *angustifolia* Pursh, Fl. Am. Sept. 480. 1814 [N. Y. to Carolina].—Willis 18.

Lespedeza angustifolia Britton 87.—Keller and Brown 202.

Frequent in dry sandy soil in the Pine Barrens and Cape May region and at several stations in the Middle district, but not known in the State to the north of our limits.

Fl.—Early August to early September. *Fr.*—Late August to late September.

Middle District.—Lawnside (S), Woodbury (KB), Mickleton (NB).

Pine Barrens.—Forked River (NB), Chatsworth, Bear Swamp (S), Williamstown Inc., Winslow Inc., Landisville, Hammonton, Egg Harbor City, Mays Landing (NB), Tuckahoe (S).

Coast Strip.—Ocean City (S).

Cape May.—Dennisville, Cold Spring (S), Bennett.

LATHYRUS L.

Lathyrus maritimus (L.). **Beach Pea.**

Pisum maritimum Linnæus, Sp. Pl. 727. 1753 [Europe].

Lathyrus maritimus Willis 19.—Britton 88.—Keller and Brown 203.

Sea beaches on the northern half of the coast, but not recorded south of New Inlet, Great Bay.

Fl.—Late May to late June, sporadically into July.

Maritime.—Sandy Hook, Belmar, Sea Bright (C), Ocean Beach (NB), Pt. Pleasant (Mackenzie), Toms River (KB), Seaside Park (C), Beach Haven (L), Beach Haven Terrace (L), Spray Beach (L), West Creek.

Lathyrus myrtifolius Muhl. **Myrtle-leaved Marsh Vetch.**

Lathyrus myrtifolius Muhlenberg in Willdenow, Sp. Pl. III. 1091. 1803 [Pennsylvania].—Keller and Brown 204.

Lathyrus palustris var. *myrtifolius* Britton 88.

Very rare within our range. The records of *L. palustris* from within our limits are doubtless this.

Fl.—Mid-June to mid-July, probably.

Middle District.—Kaighns Pt., Mantua Creek (KB), Camden Co. on the Delaware (NB), Merchantville (KB), Swedesboro (KB).

BRADBURYA Rafinesque.

Bradburya virginiana (L.). **Spurred Butterfly Pea.**

Clitoria virginiana Linnæus, Sp. Pl. 753. 1753 [Virginia].

Bradburya virginiana Keller and Brown 204.

Sandy ground; rare, discovered at Anglesea by Dr. J. Bernard Brinton about 1889, and at Swedesboro by Mr. Charles D. Lippincott, July 31, 1892.

Fl.—Early July to mid-August. *Fr.*—Early September to mid-October.

Middle District.—Swedesboro.

Coast Strip.—Anglesea.

CLITORIA L.

Clitoria mariana L. Butterfly Pea.

Clitoria mariana Linnæus, Sp. Pl. 753. 1753 [N. America].—Knieskern 13.
—Willis 19.—Britton 89.—Keller and Brown 204.

Dry sandy ground; confined to the Pine Barrens and Cape May districts, except for one station in Hudson Co. Rare and local.

The earliest record is a specimen in the Torrey Herbarium collected by Gray in 1833 (Britton's Catalogue). In 1888 Dr. Britton stated that it had not recently been collected, there being but two definite localities, Toms River, where Dr. Knieskern had collected it prior to 1856, and Little Snake Hill, Hudson Co., where Mr. W. H. Leggett obtained it in 1871. Since then Mr. Jos. Crawford found it at Hammonton, August 17, 1892. Mr. C. A. Gross collected it near Landisville. Mr. O. H. Brown discovered it north of Cape May, and Dr. J. W. Eckfeldt and a party of the Philadelphia Botanical Club collected it above Cape May Court House. .

Fl.—Mid-July to mid-August. *Fr.*—Mid-August to mid-September.

Pine Barrens.—Toms River (Kn), Hammonton, Landisville (T).

Cape May.—Court House, Cape May (OHB).

FALCATA Gmelin.

Falcata comosa (L.). Wild Pea-nut.

Glycine comosa Linnæus, Sp. Pl. 754. 1753 [Virginia].

Amphicarpea comosa Britton 89.

Common throughout the northern counties and down the Coast strip, occasional in the Middle district.

Fl.—Late July to early September. *Fr.*—Mid-September to mid-October.

Middle District.—Lindenwold.

Coast Strip.—Manahawkin, North Wildwood (OHB), Anglesea Jnc., Cape May (OHB).

Falcata pitcheri (Torrey and Gray). **Pitcher's Wild Pea-nut.**

Amphicarpæa Pitcheri Torrey and Gray, Fl. N. A. I. 292. 1838 [Red River, Arkansas].

Frequent in the Middle and Cape May districts.

The hairy form of this plant, with much larger leaves, which I take to be *F. pitcheri*, is apparently more common than the glabrous one within our limits, but I have not material to determine their relative abundance in the northern part of the State.

Fl.—Late July to early September. *Fr.*—Mid-September to mid-October.

Middle District.—New Egypt, Delair, Medford (S), Swedesboro.

Cape May.—Cold Spring.

APIOS Moench.***Apios apios* (L.). Ground Nut.**

Pl. LXXII., Fig. 2.

Glycine Apios Linnæus, Sp. Pl. 753. 1753 [Virginia].

Apios tuberosus Barton, Fl. Phila. II. 82. 1818.—Knieskern 12.—Britton 89.

Common in swamps and moist thickets throughout the State.

Fl.—Early July to late August. *Fr.*—Early September, probably into October.

Middle District.—New Egypt, Pemberton Inc. (S), Vincentown (NB), Medford (S), Hartford, Delair, Cooper's Creek, Tomlin, Mickleton, Sharps-town, Swedesboro, Beaver Dam, Dividing Creek.

Pine Barrens.—Bear Swamp (S), Albion, Williamstown Inc., Atco, Winslow (S), Landisville (T), Buena Vista (T), Hammonton, Weymouth (NB).

Coast Strip.—Toms River (S), Manahawkin, Surf City (L), Atlantic City (S), Anglesea, Wildwood (UP).

Cape May.—Sluice Creek (S), Goshen, Court House, Cold Spring.

GALACTIA P. Browne.***Galactia regularis* (L.). Milk Pea.**

Dolichos regularis Linnæus, Sp. Pl. 726. 1753 [Virginia].

Galactia glabella Pursh, Fl. Am. Sept. II. 487.—Nuttall Gen. II. 117. 1818.

—Barton, Fl. Phila. II. 83. 1818.—Knieskern 13.—Willis 19.

Galactia regularis Britton 89.—Keller and Brown 204.

Frequent in open sandy ground throughout our region, but not farther north in the State.

Fl.—Early July to mid-August. *Fr.*—Mid-August to late September (or into October).

Middle District.—Florence Hts., Ewansville (NB), Prospertown, Lindenvold, Atco (C), Kaighns Pt., Gloucester Pt., Berkeley (NB), Mickleton, Williamstown, Iona (S), Millville.

Pine Barrens.—Toms River, Waretown, Whitings, Chatsworth, Atsion, Bear Swamp (S), Chairville, Berlin, Albion, Sumner, Landisville, Pleasant Mills (NB), Mays Landing.

Cape May.—Town Bank (OHB).

Galactia volubilis (L.). Downy Milk Pea.

Hedysarum volubile Linnæus, Sp. 750. 1753 [N. America].

Lower Cape May region in similar situations to the last, differing from it in pubescence much as the two *Meibomias* and *Lespedezas* discussed above.

Flowering and fruiting apparently somewhat later than the last.

Cape May District.—Bennett, Cold Spring (OHB), Cape May.

PHASEOLUS L.

Phaseolus polystachios (L.). Wild Bean.

Dolichos polystachios Linnæus, Sp. Pl. 726. 1753 [Virginia].

Phaseolus polystachios Britton 89.—Keller and Brown 205.

In thickets; rare and local in West Jersey and at three stations just north of our region, also on the lower coastal islands. Mr. C. S. Williamson informs me that it formerly grew at Asbury Park.

Fl.—Early July to early September. *Fr.*—Early August to early October.

Middle District.—Swedesboro (CDL), Mullica Hill (NB).

Coast Strip.—Piermont (S), Wildwood.

STROPHOSTYLES Elliott.

Strophostyles helvula (L.). Trailing Wild Bean.

Phaseolus helvulus Linnæus, Sp. Pl. 724. 1753 [Carolina].—Knieskern 12. Willis 19.—Britton 90.

Strophostyles helvula Keller and Brown 205.

Phaseolus trilobus Barton, Fl. Phila. II. 82. 1818.

Open sandy ground; common in the Middle and Coastal districts, occurring at a few stations in the coastal plain north of our boundary.

Fl.—Late July to late September. *Fr.*—Late August to late October.

Middle District.—Cookstown, Delaire, Fish House (S), Kaighns Pt., Camden, Medford (S), Haddonfield, Oaklyn (S), Glassboro, Pennsgrove, Swedesboro.

Coast Strip.—Spray Beach (L), Atlantic City (S), Ocean City (S), Sea Isle City (S), Sea Isle Inc. (S), Tuckahoe (S).

***Strophostyles umbellata* (Muhl.). Pink Wild Bean.**

Pl. LXXII., Fig. 1.

Glycine umbellata Muhlenberg in Willdenow, Sp. Pl. III. 1058. 1803 [Pennsylvania].

Phaseolus peduncularis Barton, Fl. Phila. II. 81. 1818.

Phaseolus diversifolius Knieskern 12.—Willis 19.—Britton 90.—Keller and Brown 205.

Frequent in the Middle and Coastal districts, with only one record north of our region. Casually introduced in the Pine Barrens.

Fl.—Late July to mid-September. *Fr.*—Late August to mid-October.

Middle District.—Farmingdale (NB), Blackwood, Cedar Lake, Landisville, Woodstown (NB), Bridgeton.

Coast Strip.—St. Albans (L), Ship Bottom (L), Spray Beach (L), Palermo, Sea Isle Inc. (S), Five-Mile Beach.

Cape May.—Cape May Ct. House (S), Cape May (S).

Order GERANIALES.

Family GERANIACEÆ. Geraniums.

Key to the Species.

- a. Leaves pinnate, flowers purple. [*Erodium cicutarium*]*
- aa. Leaves palmately divided.
 - b. Flowers white. *Geranium carolinianum*, p. 515
 - bb. Flowers rose purple.
 - c. Petals over 10 mm. long. *G. maculatum*, p. 515
 - cc. Petals about 10 mm. long, twice as long as the sepals. *G. robertianum*, p. 515
 - ccc. Petals less than 10 mm. long, not twice the length of the sepals.
 - d. Pedicels 30–60 mm. long. [*G. columbinum*]†
 - dd. Pedicels 8–15 mm. long.
 - e. Fertile part of carpel pubescent. [*G. pusillum*]‡
 - ee. Fertile part of carpel glabrous. [*G. molle*]§

* Stork's Bill, an occasional weed in waste places, etc.

† Long-stalked Geranium; this and the two following are more or less frequent weeds in lawns, sandy fields and waste ground.

‡ Small-flowered Geranium.

§ Dovesfoot Geranium.

GERANIUM L.

Geranium maculatum L. Wild Geranium.

Geranium maculatum Linnæus, Sp. Pl. 681. 1753 [Carolina and Virginia].—Knieskern 10.—Britton 72.

Common in woods of the northern counties and frequent in the Middle district and the southern part of the Cape May peninsula.

Fl.—Late April to early June. *Fr.*—Late May to early July.

Middle District.—Farmingdale, New Egypt, Pemberton (C), Vincentown (C), Birmingham, Bordentown, Kinkora, Medford (S), Lindenwold (S), Sewell (S), Glassboro, Woodbury, Gloucester, Mickleton (H), Swedesboro.

Cape May.—Cold Spring.

Geranium robertianum L. Herb Robert.

Geranium robertianum Linnæus, Sp. Pl. 681. 1753 [Europe].—Britton 72.—Keller and Brown 206.

Frequent in wet rocky places in the northern counties and southward on the coast from Sandy Hook to Wildwood, wherever there are woods close to the beach.

The occurrence of this delicate little plant, which recalls the moist rocks and dells of the mountains, on the wooded island beaches of our southern coast is one of the curiosities of distribution, especially since it occurs nowhere else in southern New Jersey. As evidence that it is not mere chance, we have associated with it *Aquilegia canadensis*, *Lagnera stellata* and other species of like range.

Fl.—Late May to late October. *Fr.*—Late June to late November.

Coast Strip.—Sandy Hook (NB), Ventnor (H), Piermont, Wildwood.

Geranium carolinianum L. Carolina Geranium.

Geranium carolinianum Linnæus, Sp. Pl. 682. 1753 [Carolina and Virginia].—Barton, Fl. Phila. II. 63. 1818.—Knieskern 10.—Britton 72.

Open sandy ground throughout the State, but most common in the Middle district, which seems to be the true home of the species. Its tendency to become a weed certainly accounts for

* The record for Vineland, published by Keller and Brown, on authority of Miss Millie Abbott, is almost certainly one of the introduced species common in that vicinity.

the few Pine Barren records, and possibly for those north of the coastal plain.

Fl.—Early May to early June. *Fr.*—Early June to late June.

Middle District.—New Egypt, Beverly, Medford (S), Camden, Washington Park, Gloucester.

Pine Barrens.—Landisville (T), Pleasant Mills.

Coast Strip.—Beach Haven (L).

Family OXALIDACEÆ. Wood Sorrels.

Key to the Species.

- a. Flowers violet. *Oxalis violacea*, p. 516
- aa. Flowers yellow.
 - b. Peduncles mostly 2-flowered, pedicels appressed-pubescent, depressed in fruit.
 - c. Stem with closely appressed short hairs. *O. stricta*, p. 516
 - cc. Stem with loose spreading wooly pubescence. *O. filipes*, p. 516
 - bb. Peduncles mostly several flowered, pedicels ascending, their pubescence sparse, spreading. *O. cymosa*, p. 517

OXALIS L.

Oxalis violacea L. Violet Wood Sorrel.

Oxalis violacea Linnæus, Sp. Pl. 434. 1753 [Virginia and Canada].—Knieskern 10.—Britton 73.

Frequent in moist woods of the northern counties; rare and local southward in the Middle district.

Fl.—Early May to early June. *Fr.*—Not seen, apparently rare.

Middle District.—Shark River (Kn), Squan (Kn), Pemberton (NB), Swedesboro, Bridgeton (S).

Cape May.—Cape May.

Oxalis stricta L. Yellow Wood Sorrel.

Oxalis stricta Linnæus, Sp. Pl. 435. 1753 [Virginia].

Oxalis corniculata var. *stricta* Britton 73.

Common throughout the State, except in the Pine Barrens.

Fl.—Late April apparently into September. *Fr.*—Late May apparently into October.

Middle District.—Medford (S), Woodbury, Lindenwold, Millville.

Coast Strip.—Beach Haven (L), Barnegat City Inc. (L), Tuckahoe, Stone Harbor.

Cape May.—Bennett, Cold Spring.

Oxalis filipes Small. Slender Yellow Wood Sorrel.

Oxalis filipes Small, Britton and Brown, Ill. Flora. II. 346 [Virginia to Georgia].

Common in the Middle district. *O. brittonæ*, to which our plant is referable, does not seem distinct.

Fl.—Early May to early July. *Fr.*—Early June to early August (apparently).

Middle District.—New Egypt, Kinkora; Delaire.

***Oxalis cymosa* Small. Tall Yellow Wood Sorrel.**

Oxalis cymosa Small, Bull. Torr. Club XXIII. 267. 1896 [Ontario to Gulf of Mexico].

Frequent in the Middle and Coast districts.

Fl.—Late May to late September. *Fr.*—Late June well into autumn.

Middle District.—Farmingdale, Albion, Oaklyn (S), Riddleton.

Coast Strip.—Surf City (L).

Family LINACEÆ. Flax.

Key to the Species.

- a.* Flowers blue, 12-16 mm. broad. [*Linum usitatissimum*]*
- aa.* Flowers yellow, 6-8 mm. broad.
 - b.* Stem nearly terete, corymbosely branched, only the lowest leaves opposite.
 - c.* Leaves thin, oblong or lanceolate, spreading. *L. virginianum*, p. 517
 - cc.* Leaves firm, appressed, ascending.
 - d.* Capsule depressed globose, 2 mm. high. *L. medium*, p. 518
 - dd.* Capsule ovoid, 3 mm. high. *L. floridanum*, p. 518
 - bb.* Stem angled, racemosely branched, leaves below the branches mostly opposite. *L. striatum*, p. 518

LINUM L.

***Linum virginianum* L. Wild Flax.**

Linum virginianum Linnæus, Sp. Pl. 279. 1753 [Virginia and Pennsylvania].
—Knieskern 10.—Britton 71.

Dry sandy woods of the northern counties, and rarely southward in the Middle district.

Fl.—Mid-June to early August. *Fr.*—Mid-July to late August.

Middle District.—New Egypt, Mickleton.

Pine Barrens.—Pasadena (in cultivated ground, probably introduced).

Cape May.—Cold Spring (OHB).

* Flax, an occasional weed in fields and waste places.

***Linum medium* (Planch.). Stiff Yellow Flax.**

Linum virginianum var. *medium* Planchon, Lond. Jour. Bot. VII. 480. 1848
[Canada, lacus Huron, prob. S. E. Ontario].

Linum medium Keller and Brown 208.

Common in sandy woods throughout our region, but probably not north of the Coastal plain, especially abundant along the Coastal district.

Fl.—Late June to late August. *Fr.*—Mid-July to mid-September.

Middle District.—New Egypt, Swedesboro, Yorktown.

Pine Barrens.—Hammonton, Egg Harbor City.

Coast Strip.—Pt. Pleasant, Manahawkin, West Creek (S), Barnegat City (L), Spray Beach (L), Absecon (Bassett), Longport, Ocean City (S), Palermo (S), Piermont (S), Stone Harbor, Anglesea, Wildwood (UP), Cold Spring, Cape May (S).

***Linum floridanum* (Planch.). Florida Yellow Flax.**

Linum Virginianum var. *Floridanum* Planchon, Lond. Jour. Bot. VII. 480. 1848 [Florida].

Dry ground in the Pine Barrens and coast strip; rather frequent.

Fl.—Late June to late August. *Fr.*—Mid-July to mid-September.

Pine Barrens.—Winslow Inc. (S), Hammonton, Egg Harbor City, Tuckahoe (S).

Coast Strip.—West Creek (S), Cape May Ct. House (S), Cold Spring (S).

***Linum striatum* Walt. Ridged Yellow Flax.**

Linum striatum Walter, Fl. Cor. 118. 1788 [So. Carolina].—Willis 14.—Britton 71.—Keller and Brown 208.

Frequent in swampy ground throughout the State.

Fl.—Late June to mid-August. *Fr.*—Late July to early September.

Middle District.—New Egypt, Lindenwold, Camden, Swedesboro.

Pine Barrens.—Chatsworth (S), Atsion (S), Braddocks Mill (S).

Coast Strip.—Manahawkin, Tuckerton, West Creek, Petersburg (S), Wildwood.

Cape May.—Cape May Ct. House (S), Cape May.

Family RUTACEÆ. Prickly Ash, etc.***Key to the Species.***

a. Branches prickly, leaves 5-11 pinnate.

Zanthoxylum, p. 519

aa. Branches not prickly, leaves 3-foliate.

Ptelea, p. 519

ZANTHOXYLUM L.

Zanthoxylum americanum Mill. Prickly Ash.*Zanthoxylum americanum* Miller, Gard. Dict. Ed. 8. No. 2. 1768 [South Carolina].*Xanthoxylon Americanum* Britton 74.—Keller and Brown 209.

Locally common in the northern counties, but very rare in our region; reported but once within our limits—Freehold, on authority of Willis.

PTELEA L.

Ptelea trifoliata L. Three-leaved Hop Tree.*Ptelea trifoliata* Linnæus, Sp. Pl. 118. 1753 [Virginia].—Britton 74.

Woodlands in the Delaware Valley; rare. Found on Ridge's Island, Hunterdon County, and on the banks of Crosswick's Creek, both in Mercer County, by C. C. Abbott (Britton's Catalogue) and Burlington by A. C. Apgar, who collected a specimen near Bordentown, which is now in the N. J. Geological Survey herbarium at New Brunswick. This tree has almost precisely the same distribution as the Judas, both of them southern species, which find their northern limit in these river valleys, but which cannot establish themselves below the head of tide-water, probably on account of the lack of steep, wooded banks.

Fl.—Late May to mid-June. *Fr.*—September to October.*Middle District.*—Bordentown (NB).

Family POLYGALACEÆ. Milkworts.

Key to the Species.

- a. Flowers in spikes or spike-like racemes at the summit of the stem or its branches.
 - b. Basal leaves spatulate, flowers orange yellow. *Polygala lutea*, p. 520
 - bb. Basal leaves inconspicuous or wanting, flowers not yellow.
 - c. Leaves, some at least verticillate.
 - d. Spikes 4-6 mm. thick.
 - e. Most of the leaves in whorls, flowers greenish white. *P. verticillata*, p. 522
 - cc. Most of the leaves alternate, only the lowest in whorls, flowers usually slightly pink tinted. *P. ambigua*, p. 522
 - dd. Spikes 8-18 mm. thick.
 - e. Spikes sessile or nearly so, wings deltoid, flowers purple or greenish white. *P. cruciata*, p. 521
 - ee. Spikes peduncled, leaves less regularly verticillate, wings lanceolate ovate, flowers purple. *P. brevifolia*, p. 521
 - cc. Leaves all alternate.

d. Petals united into a cleft tube 6-8 mm. long, pinkish.

P. incarnata, p. 522

dd. Petals not united into a tube.

e. Spikes ovoid or globose.

f. Bracts persistent, after the falling of the rose purple or greenish flowers. *P. viridescens*, p. 523

ff. Bracts deciduous, flowers rose pink. *P. mariana*, p. 523

ee. Spikes narrow, cylindrical.

f. Leaves oblanceolate to linear, 4-12 mm. long, flowers greenish, more or less tinged with purple.

P. nuttallii, p. 523

ff. Leaves lanceolate, 25-50 mm. long, flowers white or tinged with green. *P. senega*, p. 524

aa. Flowers rose pink, in a slender raceme, pedicels distinct, numerous cleistogamous flowers on root-like subterranean branches.

P. polygama, p. 524

aaa. Flowers 1-4, large purple (14-20 mm. long), apparently terminal, leaves ovate or oblong (20-40 mm).

P. paucifolia, p. 525

POLYGALA L.

Polygala lutea L. Orange Milkwort.

Pl. LXXVII.

Polygala lutea Linnæus, Sp. Pl. 705. 1753 [Virginia].—Nuttall Gen. II. 88. 1818.—Pursh Fl. Am. Sept. 465. 1814.—Barton Fl. Phila. II. 69. 1818.—Knieskern 11.—Willis 17.—Britton 58.—Keller and Brown 210.

Common in moist sandy places in the Pine Barrens, and locally in swamps in the Middle and Cape May districts. Not recorded in the State north of our region.

This is one of the showiest plants of the Pine Barrens, one of those that render the region so strikingly different from the uplands beyond the fall line. I well remember my first visit to the Pines, when the low moist spots were all dotted with the brilliant heads of the *Polygala*, with here and there stalks of white fringed orchis, and the small orange fringed orchis, so like the *Polygala* in color, with *Nyris* and *Eriocaulon*, and a host of other things hitherto unknown. The mosquitos and heat were nothing, when such a natural flower garden lay before one's eyes, and the poor flora of my upland pastures seemed to sink into insignificance beside such riches.

When cut off by the scythe, as they frequently are on the broad strips that are cleared away on each side of the railroad as a protection against fire, they send up new shoots or branches, which bloom late in the autumn.

Fl.—Mid-June to mid-October.

Middle District.—Shark River, New Egypt, Burlington, Pemberton (C), New Lisbon (C), Lindenwold, Lawnside (S), Tomlin, Mickleton, Swedesboro, Elmer (P), Dividing Creek, Haleyville (P).

Pine Barrens.—Long Branch, Forked River, Toms River, Allaire, Island Hts. (NY), Manchester (NY), Tuckerton, Jones Mill (S), Speedwell (S), Chatsworth, Atco, Jackson, Clementon, Bear Swamp, Braddocks Mill, Kenilworth (S), Albion, Andrews, Folsam, Landisville, Vineland (S), Hammonton, Batsto, Pleasant Mills, Egg Harbor City, Mays Landing (NJ).

Cape May.—Court House (S), Dias Creek (S), Whitesboro (S), Cold Spring (S), Cape May (P).

***Polygala cruciata* L. Cross-leaved Milkwort.**

Pl. LXXIII.

Polygala cruciata Linnæus Sp. Pl. 706. 1753 [Virginia].—Knieskern 11.—Willis 17.—Britton 59.—Keller and Brown 210.

Common in damp ground in the Pine Barrens and locally in the Middle, Coast and Cape May districts, occurring at a few stations north of our limits, but all within the coastal plain.

This, and the smaller *P. nuttalli*, are the most widely and uniformly distributed species of *Polygala*; occurring everywhere throughout the New Jersey coastal plain, where conditions are favorable, even down to the very edge of the salt meadows.

While usually about the color of red clover, which it somewhat resembles as we see it scattered about among the grass and sedges, *Polygala cruciata* is sometimes entirely greenish, a condition that is more familiar in *P. viridescens*, in which the two color phases were originally described as different species.

Fl.—Late July to early October.

Middle District.—Long Branch, Ocean Beach (NJ), New Egypt, Orchard (S), Griffith's Swamps, Mickleton (NB), Swedesboro, Dividing Creek.

Pine Barrens.—Toms River, Island Hts. Inc., Forked River, Waretown, West Creek, Coxe's, Plains, Woodmansie, Speedwell, Parkdale, Bear Swamp, Williamstown Inc., Winslow Inc., Winslow (S), Twelfth St., Folsom, Hammonton, Batsto, Egg Harbor City, Absecon, Palermo (S), Petersburg (S), Tuckahoe (S), Ocean City Inc., Woodbine.

Coast Strip.—Seaside Park, Barnegat City (L).

Cape May.—Green Creek, Cold Spring (S), Bennett (S).

***Polygala brevifolia* Nutt. Short-leaved Milkwort.**

Pl. LXXVI. Fig. 1.

Polygala brevifolia Nuttall Gen. II. 89. 1818 [Sandy swamps of New Jersey].

—Willis 17.—Britton 59.—Keller and Brown 210.

Common in moist ground in the Pine Barren district, but found elsewhere only in Secaucus Swamp, Hudson County, and

one or two stations in West Jersey, all of them outlying "Pine Barren islands."

Fl.—Mid-July to mid-October.

Middle District.—New Egypt, Ashland.

Pine Barrens.—Toms River, Forked River, Waretown, Pasadena, Barnegat (S), West Creek (S), Lakehurst, Plains, Bamber, Cedar Bridge, Chatsworth, Jones Mill (S), Speedwell, Whitings, Hanover, Woodmansie, Pemberton (KB), Bear Swamp, Winslow (P), Atsion, Parkdale, Sumner (S), Williamstown Inc., Mouth of Batsto, Absecon, Pancoast (S), Egg Harbor City, Lucaston, Batsto, Quaker Bridge, Pleasant Mills, Hammonton, Weymouth, Mays Landing (NB).

***Polygala verticillata* L. Whorled Milkwort.**

Pl. LXXIV. Fig. 3.

Polygala verticillata Linnæus, Sp. Pl. 706. 1753 [Virginia].—Knieskern II.—Britton 59.

Dr. Britton gives this species as common in dry soil throughout the State. In the southern half, however, it seems to be mainly restricted to the Coastal strip and the coast of Delaware Bay, where it occurs close to the edge of the salt marshes in damp sandy ground.

Two records from the Pine Barrens are from cultivated ground and apparently introduced.

Fl.—Late June to mid-October.

Middle District.—Camden (P), Clementon.

Pine Barrens.—Winslow Inc., Landisville (T).

Coast Strip.—Pt. Pleasant, Ship Bottom (L), Surf City (L), St. Albans (L), Atlantic City, Longport, Piermont (S), Stone Harbor, Anglesea, Cape May, Cape May Ct. House, Cold Spring (S), Cape May, Dias Creek, Halesville (NB).

***Polygala ambigua* Nutt. Loose-spiked Milkwort.**

Pl. LXXIV. Fig. 1.

Polygala ambigua Nuttall Gen. II. 89. 1818 [New Jersey and Virginia].—Knieskern 12. 1856.

Rare and local in the Middle district and Pine Barrens; apparently introduced in the latter.

Fl.—Late June to mid-October.

Middle District.—Kinkora (NY).

Pine Barrens.—Williamstown Inc. (A), Hammonton (A).

***Polygala incarnata* L. Pink Milkwort.**

Pl. LXXV. Fig. 1.

Polygala incarnata Linnæus, Sp. Pl. 701. 1753 [Virginia and Canada].—Pursh Fl. Am. Sept. II. 464.—Willis 17.—Britton 58.—Keller and Brown 210.

Sandy ground; restricted to the lower part of the Middle district; not common.

Fl.—Late June to mid-September.

Middle District.—Haddonfield, Griffith's Swp. (P), Clarksboro, Mickleton (H), Swedesboro, Bridgeton.

***Polygala viridescens* L. Purple Milkwort.**

Pl. LXXVIII. Fig. 2.

Polygala viridescens Linnæus, Sp. Pl. 705. 1753 [Virginia].

Polygala purpurea Barton, Fl. Phila. II, 69. 1818.

Polygala sanguinea Knieskern II.—Britton 59.

Moist sandy ground; at two stations in the northern counties; common in the upper part of the Middle district, becoming less frequent southward, and occasional in the Coastal and Cape May districts.

Flowers sometimes quite green, with scarcely a trace of pink.

Fl.—Mid-June to mid-October.

Middle District.—Allaire (S), Farmingdale, Deal, Brindletown, Pemberton, (NB), Hartford, Haddonfield, Lawnside (S), Lindenwold, Mickleton, Swedesboro, Riddleton.

Pine Barrens.—Oak Road Station near Landisville.

Coast Strip.—Pt. Pleasant, Bayhead (NB), Manahawkin.

Cape May.—Green Creek.

***Polygala mariana* Mill. Maryland Milkwort.**

Pl. LXXVIII. Fig. 1.

Polygala Mariana Miller, Gard. Dict. Ed. VIII. No. 6. 1768 [Maryland].—Keller and Brown 210.

Polygala fastigiata Nuttall, Gen. II. 89. 1818 [New Jersey].—Knieskern II.—Britton 59.

Sandy ground, rare and local; confined to the Pine Barren and Cape May districts.

Fl.—Late June to early October.

Pine Barrens.—Allaire, Berlin, Woodbine.

Cape May.—Below Court House, Green Creek, Bennett.*

***Polygala nuttallii* Torr. & Gray. Nuttall's Milkwort.**

Pl. LXXIV. Fig. 2

Polygala Nuttallii Torrey and Gray, Fl. N. A. I. 670. 1840. n. n. for *P. sanguinea* Nuttall (nec L.) [Pine Barrens of N. J.].—Britton 59.

* The record for Swedesboro in Keller and Brown's list proves to be *P. viridescens*, that for Hammonton cannot be verified.

Polygala sanguinea Nuttall Gen. II. 88. 1818.—Barton Fl. Phila. II. 70.—Willis 17.

Open swampy ground or wet sandy places; common throughout our district and in that portion of the country to the north that lies in the Middle district. Apparently does not extend north of the coastal plain. Most plentiful in the Pine Barrens.

This is our commonest small *Polygala*, and as universally distributed through the Pine Barrens as *P. lutca*. Nuttall, who discovered it and was clearly aware of its distinctness, mistook it for the *P. sanguinea* of Linnæus, which was merely the pink form of *P. viridescens*, so Torrey and Gray fittingly honored the memory of the discoverer by naming it after him. Few botanists were better acquainted with the Pine Barren flora than Thomas Nuttall, and it is well to have his name associated with it in this plant, *Lobelia Nuttallii*, etc. His type specimens, with their small, closely-written labels, and all new species marked with a star, are still preserved in the herbarium of the Philadelphia Academy, where he worked for many years.

Fl.—Early July to mid-October.

Middle District.—Shark River, Farmingdale, Medford, Lindenwold, Sickler-ville (S), Mickleton, Swedesboro, Dividing Creek.

Pine Barrens.—Allaire, Forked River, Whittings, Bear Swamp (S), Brad-docks Mill, Taunton, Speedwell (S), Clementon, Williamstown Jnc., Landis-ville, Hammonton (S), Pleasant Mills, Pancoast, Absecon (S), Egg Harbor City, Woodbine, Belleplain (S), "Pine Cottage."

Coast Strip.—Long Branch (C), Spring Lake (NB), Pt. Pleasant, Beach Haven (L), Anglesea.

Cape May.—Court House, Green Creek (S), Dias Creek (S), Whitesboro.

***Polygala senega* L. Seneca Snake-root.**

Polygala Senega Linnæus, Sp. Pl. 704. 1753 [Virginia, Pennsylvania and Maryland].—Britton 59.

Probably extinct. Formerly occurred in New Jersey in the vicinity of New York City, according to Torrey, and at Griffith's Swamp, [=Lawnside] Camden County, according to Charles E. Smith (Britton's Catalogue).

***Polygala polygama* Walt. Racemed Milkwort.**

Pl. LXXV., Fig. 2.

Polygala polygama Walter, Fl. Car. 179. 1788 [S. Carolina].—Knieskern 12.—Britton 60.—Keller and Brown 211.

Dry sandy ground at several stations in the northern counties and locally common in the upper part of the Middle district; rare in the Pine Barrens.

Fl.—Early June to late July, or occasionally later.

Pine Barrens.—Williamstown Inc., Cedar Brook, Winslow Inc., Folsom, Hammonton.

Middle District.—Deal, Sea Bright (NB), Manasquan, Pt. Pleasant, Bay Head (NY), Sicklerville (S), Williamstown, Newfield, Franklinville (P), Clementon, Centerton (S), Forest Grove (S), Riddleton.

***Polygala paucifolia* Willd. Flowering Wintergreen. Gay-Wings.**

Pl. LXXVI., Fig. 2.

Polygala paucifolia Willdenow, Sp. Pl. III. 880. 1800 [Pennsylvania].—Willis 17.—Britton 59.—Keller and Brown 211.

Rich woods of the northern counties; very rare within our limits and reported from but one station—at Freehold, Monmouth County—on authority of Mr. O. R. Willis (Britton's Catalogue).

Fl.—Early May to mid-May, probably.

Family EUPHORBIA~~CE~~Æ. Spurges, etc.

Key to the Species.

- a. Flowers not surrounded by a corolla-like involucre, but with a true calyx.
 - b. Plants wiry (1-5 dm. high), silvery-scurfy, leaves mostly linear lanceolate, flowers minute in clusters, staminate with petals, pistillate without, calyx 5-parted. *Crotonopsis linearis*, p. 526
 - bb. Plants green, branching, leaves ovate to lanceolate, flowers minute in spikes or clusters, which are nearly equalled or exceeded by a leaf-like lobed bract.
 - c. Leaves ovate, spikes mostly shorter than the bract. *Acalypha virginica*, p. 526
 - cc. Leaves lanceolate or linear, spikes longer than the bract. *Acalypha gracilens*, p. 527
- aa. Flowers minute, fertile one in the center, consisting of three styles; sterile ones around it, consisting of a single stamen each, involucre resembling a calyx or corolla, with glands at the sinuses, which are sometimes provided with petal-like appendages; fertile flowers exerted in fruit.
 - b. Glands with petal-like appendages.
 - c. Leaves opposite.
 - d. Leaves entire, glabrous, prostrate. *E. polygonifolia*, p. 527
 - dd. Leaves serrate or dentate.
 - e. Plant prostrate, pubescent or puberulent. *E. maculata*, p. 527
 - ee. Plant upright glabrous. *E. preslii*, p. 527

- cc. Leaves alternate, flowers in a terminal umbel, appendages showy, white. *E. corollata*, p. 528
- bb. Glands without petal-like appendages.
- c. Leaves mostly opposite, plant prostrate, flowers appearing before the leaves.
- d. Segments of involucre small, green; plant low. *E. ipecacuanha*, p. 528
- dd. Segments of involucre enlarged, white; plant erect. *E. arundelana*, p. 529
- cc. Leaves alternate or scattered, plant 4-15 decimeters tall, flowers in a terminal umbel. *E. darlingtonii*, p. 529

CROTONOPSIS Michaux.

Crotonopsis linearis Michx. *Crotonopsis*.

Crotonopsis linearis Michaux, Fl. Bor. Am. II. 186. pl. 46. 1803.—[Long Bay, Carolina and Illinois].—Nuttall, Gen. II. 209. 1818.—Knieskern 27.—Willis 54.—Britton 215.—Keller and Brown 211.

In dry sandy woods; rather rare and local. Restricted to the Pine Barrens and a few localities in West Jersey.

A curious little plant, which in its slender wiry leaves and branches remind one somewhat of *Anychia*, but it is grayish all over with a peculiar silvery sheen, which distinguishes it at once.

Fl. and *Fr.*—August and September, apparently.

Middle District.—Kirkwood, Ashland, Lindenwold, Taunton, Woodbury (P).

Pine Barrens.—Manchester (C), Southwark (S), Atsion (Leeds), Hamonton (KB), Pleasant Mills, Batsto.

ACALYPHA L.

Acalypha virginica L. *Three-seeded Mercury*.*

Acalypha virginica Linnæus, Sp. Pl. 1003. 1753 [Virginia].—Knieskern 27.

Fields and woods, usually in damp situations: common in the northern counties and less common southward in the Middle, Coast and Cape May districts. Distinctly a weed in many places.

Fl.—Probably early July into September. *Fr.*—August into October (apparently).

Middle District.—New Egypt, Birmingham, Hartford, Oaklyn, Lawnside, Swedesboro, Salem (S), Beaver Dam.

Coast Strip.—Cox's.

Cape May.—Cape May (OHB).

*The southern *A. ostryaefolia* is reported from Princeton, Trenton and Closter (Britton's Catalogue), but has not been collected within our limits.

Acalypha gracilens A. Gray. **Slender Three-seeded Mercury.**

Acalypha gracilens A. Gray, Man. 408. 1848 [New Jersey].—Knieskern 27.

Acalypha virginica var. *gracilens* Britton 215.

Fields and woods in dryer ground; occasional northward, but frequent in the Middle, Coast and Cape May districts. A weed in most places, and as such sparingly introduced into the Pine Barrens.

Fl. and *Fr.*—Apparently as in the last.

Middle District.—Springdale (S), Clarksboro, Mickleton (H), Salem (S).

Pine Barrens.—Newtonville, Landisville (T), Pleasant Mills.

Coast Strip.—Waretown, Surf City (L).

Cape May.—Cape May (OHB).

EUPHORBIA L.**Euphorbia polygonifolia** L. **Seaside Spurge.**

Euphorbia polygonifolia Linnæus, Sp. Pl. 455. 1753 [Canada and Virginia].—

Knieskern 27.—Willis 54.—Britton 214.—Keller and Brown 212.

Sea beaches; common along the entire coast and for some distance along the bay side of Cape May. The Camden record, given on Martindale's authority, is probably a ballast plant.

Fr.—Early August into October.

Maritime.—Sandy Hook, Long Branch, Pt. Pleasant, Waretown, St. Alban's (L), Spray Beach (L), Island Hts. Inc., Brigantine, Atlantic City (S), Ocean City (S), Stone Harbor (S), Wildwood, Cape May, Cape May Pt. (S).

Euphorbia maculata L. **Spotted Spurge.**

Euphorbia maculata Linnæus, Sp. Pl. 455. 1753 [N. Amer.].—Britton 214.

Dry ground in the Northern, Middle and Coast districts, apparently everywhere a weed.

Fr.—Late July into October.

Middle District.—Bloomsbury, Lawnside (S), Clementon (S), Swedesboro.

Coast Strip.—N. Beach Haven (L), Peahala (L), St. Alban's (L), Ship Bottom (L).

Euphorbia preslii Guss. **Upright Spurge.**

Euphorbia preslii Gussone, Fl. Sic. Prodr. I. 539. 1827 [].*

Euphorbia hypericifolia Barton, Fl. Phila. II. 185. 1818.—Knieskern 27.—Britton 214.

Frequent in fields, etc., in the Northern and Middle districts; everywhere a weed.

Fr.—Late July into October.

Middle District.—Swedesboro, New Egypt.

* This is the only reference that I have been unable to verify.

Euphorbia corollata L. Flowering Spurge.

Euphorbia corollata Linnæus, Sp. Pl. 459. 1753 [Virginia and Canada].—Knieskern 27.—Willis 54.—Britton 214.

Dry ground; occasional just north of our limits and southward in the Middle and Coastal districts. Apparently in part a weed.

Fl.—Early June to early September.

Middle District.—Blue Ball (NB), Red Bank (NB), Cooper's Creek, Tomlin, Mickleton, Swedesboro.

Coast Strip.—Pt. Pleasant (S), Petersburg (OHB).

Cape May.—Rio Grande (OHB).

Euphorbia ipecacuanhæ L. Wild Ipecac.

Euphorbia ipecacuanhæ Linnæus, Sp. Pl. 455. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 185. 1818.—Knieskern 27.—Willis 54.

Common in sand in the Pine Barrens and occasional in sandy spots of the Middle district including its extension north of our boundary and in the Cape May peninsula.

This is another of the characteristic plants of the Pine Barrens, delighting in the most arid stretches of white sand. Its tufts of yellow blossoms, which appear before the foliage, and later its rosettes of somewhat fleshy leaves, will be found to spring from a cluster of slender stems, which unite as we dig downward until they finally coalesce into one stout root. How far it descends I have never been able to ascertain, though I have followed several for three feet into the sand, at which point they showed no sign of diminishing in thickness. Both leaves and stems are full of the milky juice characteristic of the genus. The leaves vary greatly in both size and color, some are linear and others broadly oval 5.5×3 cm. with all possible intermediates, while all styles occur either green or deep crimson. The variations are not correlated with any conditions of environment, so far as one can see, extremes growing side by side in perfectly uniform surroundings.

Fl.—Late April to late May. *Fr.*—Late May to late June.

Middle District.—New Egypt (NB), Medford (S), Locust Grove (S), Lindenwold (S), Camden, Washington Park, Westville, Woodbury, Mantua, East of Sewell (S), Sicklerville (S), Mickleton, Swedesboro, Yorktown, Two miles west Bridgeton (S).

Pine Barrens.—Farmingdale, Toms River, Forked River, Waretown, Davenport, East and west Plains, Head of Batsto (S), Browns Mills, Folsom, Hamonton (Bassett), Pancoast (NB), Mays Landing (NB), Newfield (S), Ocean City Inc., Palermo.

Cape May.—Cold Spring (OHB).

***Euphorbia arundelana* Bartlett. Bartlett's Spurge.**

Euphorbia arundelana Bartlett, Rhodora XIII. 164. 1911 [Laurel, Ann Arundel Co., Md.].

A specimen collected by Mr. Chas. D. Lippincott at Swedesboro, N. J., May 27th, 1894, is obviously referable to this recently described species.

Middle District.—Swedesboro.

Euphorbia darlingtonii* Gray. Darlington's Spurge.

Euphorbia Darlingtonii Gray, Man. 404. 1848 [Chester Co., Pa.].—Keller and Brown 213.

Very rare in woods in the lower Middle district. Unknown in the State until collected near Woodstown, June 15, 1895, by Mr. Charles D. Lippincott.

Mature fruit June 15.

Middle District.—Woodstown.

Family CALLITRICHACEÆ. Water-starworts.

Key to the Species.

- a. Fruit short-peduncled, bracts wanting, terrestrial. *C. austini*, p. 529
- aa. Fruit sessile, aquatic or with terrestrial forms growing on mud, bracts present.
 - b. Fruit oval, longer than the styles. *C. palustris*
 - bb. Fruit obovate, shorter than the styles. *C. heterophylla*, p. 530

The flowers are very small and inconspicuous, consisting of a single stamen or pistil. They begin to bloom in late spring. Taxonomic characters are based on the fruit.

CALLITRICHE L.

***Callitriche austini* Engelm. Austin's Water Starwort.**

Callitriche Austini Engelmann, Gray's Man. Ed. V. 428. 1867 [New Jersey].—Britton 106.

Damp shady soil at several stations in the northern counties and Middle district; rare and local.

* Named for its discoverer, William Darlington (1782-1863), of West Chester, Pa., author of the classic *Flora Cestricea*.

Fruit—Well developed June 15, 1895—Riddleton.

Middle District.—Riddleton.

***Callitriche heterophylla* Pursh. Larger Water Starwort.**

Callitriche heterophylla Pursh, Fl. Am. Sept. 3. 1814 [N. America].—Barton, Fl. Phila. I. 2. 1818.—Britton 106.

In streams and ponds; frequent in the Northern and Middle districts.

Variable in form and habit. Specimens from our range that have been referred to *C. palustris* prove to be this, so far as I have been able to examine them.

Fruit—Well developed, but not necessarily mature; late May into October.

Middle District.—Farmingdale, New Egypt, Delanco, Swedesboro, Clementon (S), Pitman, Riddleton.

Order SAPINDALES.

Family EMPE'TRACEÆ. Crowberries.

COREMA Don.

***Corema conradii* (Torr.). Conrad's Crowberry.**

Pl. LXXIX.

Empetrum Conradii Torrey, Ann. Lyc. N. Y. IV. 83. 1837 [Pine Barrens, near Cedar Bridge, Monmouth Co., N. J., also Pemberton Mills, 10 miles from Burlington, N. J.].

Corema Conradii Willis 54.—Britton 228.—Keller and Brown 214.—Redfield, Proc. A. N. S. Phila. 1869, 91-92.—do.—Redfield, Bull. Torr. Bot Club, 1884, 97.—do. 1889, 193-195.—Britton, Bull. Torr. Club, 1884, 117.—do. 1889, 195.—Saunders, Proc. A. N. S. Phila. 1900, 544.—Stone, Bartonica 1910, 26.

At several stations on the Plains or their borders in Ocean and Burlington Counties, also formerly at Pemberton, where it is now apparently extinct.

This interesting plant, which here reaches the southern limit of its range,* has attracted more attention among botanists than any other member of the Pine Barren flora, unless it be *Schizaea pusilla*. It is an inhabitant of those desolate stretches of white sand barrens which cover the most elevated portion of the Pine

* Prof. Fernald (Rhodora, 1911, p. 139) regards it as a Coastal Plain plant, pushing north to Newfoundland. I have always looked upon it as a northern species ranging south to New Jersey!

Barren region, stretching away for some thirty square miles, for the most part devoid of trees higher than one's knees. But trees there are in abundance, round boles of pitch pine trunks, which send out prostrate branches, or short upright ones, bearing an abundance of cones; and scrub oaks of several species—*Q. ilicifolia* and *marilandica*—everywhere stunted. Here and there the Bearberry *Arctostaphylos* trails about over the coarse white sand and gravel, and then at favored spots are great round cushions of the *Corema*, one to three feet in diameter, the basal portion a tangle of brown stems and dead branches, but the surface of the mass, covered with fresh green leaves—little slender green needles recalling those of some conifer—and at the tip of each spray a blossom or fruit, according to season; neither of them very conspicuous, although the purple anthers do stand out rather brightly when the plant is in full bloom.

The history of the discovery and re-discovery of the plant in New Jersey is interesting, and I quote in full that portion of an article of Mr. J. H. Redfield, which refers to the plant in our State.* Mr. Redfield says:

“It is said to have been first discovered by Prof. Solomon W. Conrad† as early as 1831 near Pemberton Mills, about ten miles from Burlington, N. J., and a fragment so ticketed (with a ?) is in the herbarium of the Philadelphia Academy. Soon after Rafinesque collected it at Cedar Bridge, Monmouth County, about twenty-two miles southeast of Pemberton. This locality was visited about 1833 by Dr. Torrey, who published the first description of the plant under the name of *Empetrum Conradii*, in Annals of N. Y. Lyceum of Nat. Hist., iv., 83. In April, 1869, in company with the late Charles F. Parker, I made some examination of the vicinity of Pemberton, and also visited Cedar Bridge in search of the plant. The encroachment of cultivation near the former place discouraged search, but at Cedar Bridge the localities which Dr. Torrey in his paper has so carefully indicated, were readily identified. But no trace of the plant was seen either at these points or elsewhere

* Bull. Torr. Bot. Club, 1884, p. 97.

† 1779–1831. A botanist of note, professor at the University of Pennsylvania, 1829–1831, and an authority on the flora of Southern New Jersey.

during a search of some hours. Dr. Torrey described it as growing in a few patches "in the pure white sand of that region." These places, as I now remember them, were quite bare of vegetation at that early spring season, but the prevailing tree growth of all that region is a very stunted form of *Pinus rigida*. At the time of Rafinesque's and Torrey's visits, Cedar Bridge was an inn for the accommodation of the limited summer travel of that period by stage-coach between Philadelphia and Barnegat Bay. Now, alas! an occasional clam-wagon is the only visitant, and as I remember the house in 1869, it was as rough a hostelry as it has been my lot to encounter. I have some doubt whether Conrad's and Rafinesque's localities were not the same.*

Dr. Knieskern is said to have found the plant at other points in Monmouth County, but this has not been confirmed, nor is the *Corema* enumerated in his Catalogue of the Plants of Monmouth and Ocean Counties, published in 1856. There is, however, a large tract of absolute wilderness lying between the New Jersey Southern Railroad and Barnegat Bay which may reward exploration."

The next reference to the species in New Jersey is not very satisfactory, being a brief note of Prof. O. R. Willis to Dr. Britton.† It probably refers in part, at least, to Dr. Knieskern's discovery of the plant, as he lived at Manchester. He writes: "We found *Corema* west of Toms River and north of Manchester; also west of *Squam*, south of the river. It was not rare in those neighborhoods. It is, though, at least thirty years since I visited them, and the localities have perhaps been exhausted."

The only specimen which may be cited to substantiate these records is one in the Philadelphia Academy, received from Dr. Gray, labeled "Monmouth Co., N. J., Coll. H. Mann." I should strongly suspect that Prof. Willis, after this lapse of time, might

* In the Torrey Bulletin for October, 1884, p. 117, Dr. N. L. Britton states that there seems to be no doubt that Mr. S. W. Conrad did collect the plant at Pemberton's Mills about twelve miles from Burlington, N. J., for a specimen so ticketed is in the Torrey Herbarium.

It seems to me that it could easily have been sent to Conrad by a resident of Pemberton who actually collected it much farther east.

† Torrey Bulletin XVI., 1889, p. 195.

have been mistaken in the occurrence of the plant, especially since Dr. Knieskern does not include it in his list. Several other important New Jersey records which originate in Prof. Willis' Catalogue have never been substantiated.

At any rate, from this time, say 1854 until 1886, the plant was completely lost, so far as New Jersey was concerned. In that year it was rediscovered by Mr. F. J. H. Merrill, of Columbia College, in the barren plains west of Cedar Bridge, exactly where Mr. Redfield suggested in 1869,* that it might be found when reporting to the Philadelphia Academy the failure of the efforts of Mr. Charles F. Parker and himself to rediscover it.

The discovery was communicated to Dr. Britton, who visited the spot with Messrs. Thomas Hogg and J. I. Northrup, in May, 1887. On April 3, 1889, Dr. Britton, Mr. Redfield, Mr. Arthur Hollick and Dr. J. Bernard Brinton, visited the locality, and I quote from Mr. Redfield's second paper on the subject:† "The locality is about two and one-half miles due west from Cedar Bridge, and about ten miles west of the railroad station at Barnegat. It lies on both sides of the county line dividing Ocean and Burlington Counties. It is easiest reached from Barnegat by taking the straight road from that place to Cedar Bridge (about eight miles), then taking the straight road running west-northwest from Cedar Bridge toward Buddstown for about two and one-half miles to where that road is crossed by a north and south road, and following this for half or two-thirds of a mile south.

"The region is a most remarkable one, which cannot fail to impress every visitor with a sense of loneliness and sterility. It forms part of the watershed, or divide, between the streams flowing into the Atlantic and those discharging into the Delaware River. Locally it is known as the "West Plains," but these so-called "plains" are long, undulating swells of sand, sometimes rising to a height commanding extensive views in every direction over a desert of sand so sterile that even the trees of *Pinus rigida*, which sparsely clothe it, can attain only to the height of three or four feet. No sign of human life is

* Proc. Acad. Nat. Sci., Phila., 1869, 91, 92.

† Bull. Torrey Bot. Club XVI., 1889, p. 193-195.

visible and one could readily imagine himself in the midst of a vast wilderness. Its height above the ocean is between 150 and 200 feet, according to the Geological Survey. The region is bisected by the north and south road I have mentioned, by the side of which the usual low matted patches of *Corema* appear. But on leaving the road to examine the extent of its distribution we become amazed at the expanse of territory more or less covered by it. We followed over the rising swells of ground already alluded to, both to the east and west of the road, to the extent of at least half a mile each way, and for a like distance in the opposite direction without entirely losing sight of the *Corema*, and we probably did not reach its limits. To say that there are hundreds of acres of it is a statement which my companions thought to be far short of the truth. In some places the patches were separated by intervals of some rods, but often scores of them were seen at once, and in many places they became confluent in large masses, reminding one of the appearance of the plant at Plymouth, Mass. Besides the thick, scattered, stunted pines, little shrubbery was seen, other than occasional very small specimens of *Quercus ilicifolia*, but the sandy spaces were often partially covered with *Arctostaphylos Uva-ursi*, and the whole region reminded one of the downs of the interior of Nantucket, where the *Arctostaphylos* is so very abundant. Occasional carpets of *Pyxidanthera* were near, but rarely with the *Corema*.

"Though our visit was made before April had expired, the unusually advanced season had carried the *Corema* beyond its flowering stage, and its stamens were mostly withered, though not fallen. Staminate and pistillate plants seemed equally abundant.

"When Mr. Merrill first discovered this locality it was, I believe, unscathed by fire, but at the time of Dr. Britton's first visit the region had been burned over, so far as it was possible to burn so sparse a growth, and the low pines had been singed and mostly killed. Now, among the blackened trunks fresh sprouts of these pines are appearing. But what most excited our surprise was to see myriads of young seedling plants of *Corema* springing out of the sand in the intervals between the

patches, and it would seem as if the seeds, carried by the winds, had availed themselves of every spot of bare sand, there to lodge and germinate. None of these seedlings were more than two years old, many not more than one.

"In illustration of the apparently capricious manner in which this plant appears, I may mention that on our return to Barnegat we saw two or three patches of it on the south side of the road, about three miles west of Barnegat, within half a yard of the wheel track. Search for more of it in this vicinity was unsuccessful, so also was a re-examination of the original locality near the old western hotel at Cedar Bridge."

As I had become connected with the Academy of Natural Sciences but a short time before Mr. Redfield's account was published, I heard a good deal of the re-discovery of *Corema*, and was anxious to see it for myself. Consequently, on March 31, 1893, in company with Messrs. Stewardson Brown, Amos P. Brown and Joseph Crawford, I visited this locality. We were, I think, the first to approach it from the west, leaving Woodmansie station on the New Jersey Southern Railroad and walking seven miles through the loose sand and back again in time for the afternoon train.

The plant was at this time in full bloom, and its weird surroundings and the forced march of fourteen miles made a lasting impression on my mind.

On July 3, 1899, Mess. C. F. Saunders and W. N. Clute, on a wagon trip across the lower or East Plains, found the *Corema* west of Munyon Field in exactly similar environment to that prevailing on the West Plains; and also sparingly west of the east branch of the Wading River, in pine woods at least four miles from the Plains. These localities are some eleven miles south of the Cedar Bridge station.*

In June, 1901, accompanied by Messrs. H. L. Coggins and J. A. G. Rehn, I crossed by wagon from Medford nearly to Munyon Field and found the plant abundant at Mr. Saunders' locality.

The next year, on a tramp across this section from Cedar Grove to Chatsworth, Mr. J. A. G. Rehn and I found it just

* Proc. Acad. Nat. Sci., Phila., 1900, p. 544.

east of Cedar Grove, within sight of the houses; and on May 8, 1911, I found an isolated colony in the pine woods at Eagleswood, on West Creek, three miles from the town of West Creek.

From the variation, in abundance of the species at different times, and its apparent disappearance from some stations, it seems to me that it probably dies out or is exterminated by fire in certain spots, while the seed blown freely over this wind-swept waste is constantly starting new colonies, so that its actual stations are continually shifting.

Fl.—Late March to mid-April, stamens drying and persisting through the spring. *Fr.*—Late June to early July, apparently.

Pine Barrens.—Pemberton Mills 12 miles from Burlington, Monmouth Co., Cedar Bridge, 3 miles west of Cedar Bridge, 4 miles east of Woodmansie, 6 miles each of Woodmansie, 3 miles west of Barnegat, Between Allen's Bridge (High Bridge) and Martha. East Plains near Munyon Field, Three miles northwest of West Creek.

Family ANACARDIACEÆ. Sumacs.

Key to the Species.

- a.* Leaves 9-31 foliate, fruit clothed with crimson hairs.
 - b.* Rachis of the leaf wing margined. *Rhus copallina*, p. 536
 - bb.* Rachis of the leaf nearly terete.
 - c.* Foliage and twigs velvety pubescent. *R. hirta*, p. 537
 - cc.* Foliage and twigs glabrous and glaucous. *R. glabra*, p. 537
- aa.* Leaves not more than 13 foliate, fruit whitish or dun-colored.
 - b.* Leaflets 7-13 glabrous. *R. vernix*, p. 537
 - bb.* Leaflets always 3.
 - c.* Vine climbing by aerial rootlets or trailing, leaves glabrate entire or sparingly sinuate or toothed. *R. radicans*, p. 538
 - cc.* Low, erect shrub, mostly without aerial rootlets, leaves very pubescent and deeply lobed. *R. toxicodendron*, p. 538

RHUS L.

Rhus copallinum L.* Dwarf Sumac.

Rhus Copallinum Linnæus, Sp. Pl. 266. 1753 [N. America].—Pursh, Fl. Amer. Sept. I. 205. 1814.—Knieskern II.—Britton 79.

Frequent in sandy soil throughout the Northern, Middle and Coast districts. Occasional in the Pine Barrens, where it is introduced.

Fl.—Late July to early September. *Fr.*—About late August into October.

* Linnæus seems to use this name in the genitive plural; if so we have no right to alter it to *copallina*.

Middle District.—New Egypt, Pemberton Inc. (S), Chairville (S), Blackwood, Mickleton, Swedesboro, Beaver Dam.

Pine Barrens?—Landisville.

Coast Strip.—Sandy Hook, Forked River, Beach Haven (L), Beach Haven Terrace (L), Cedar Bonnet (L), Atlantic City (S), Ocean City (S), Piermont (S), Wildwood (UP).

Cape May.—Bennett, Cape May.

***Rhus hirta* (L.). Stag-horn Sumac.**

Datisca hirta Linnæus, Sp. Pl. 1037. 1753 [Philadelphia].

Rhus typhina Britton 79.

Frequent in rocky woods of the northern counties, extending down the Delaware River, within our limits, where it is very rare. Mr. Long has noted it at Florence Heights and Washington Park.

Fl.—Early June to early July. *Fr.*—About late July into September.

Middle District.—Bordentown, 1 mile south Mickleton.

***Rhus glabra* L. Smooth or Scarlet Sumac.**

Rhus glabra Linnæus, Sp. Pl. 265. 1753 [North America].—Britton 79.

Frequent in dry soil in the northern counties; much less common southward in the Middle district. Very rare in the southern part of the Cape May peninsula and on the coast.

Fl.—Mid-June to mid-July. *Fr.*—About late July into September.

Middle District.—New Egypt, Williamstown, Tomlin, Haddonfield (P).

Coast Strip.—Peahala (L).

Cape May.—New England (OHB).

***Rhus vernix* L. Poison Sumac.**

Rhus Vernix Linnæus, Sp. Pl. 265. 1753 [North America].—Barton, Fl. Phila. I. 154. 1818.

Rhus venenata Knieskern 11.—Britton 79.

Swamps throughout the coastal plain, most abundant in the Pine Barrens, also at three localities in Sussex and Morris Counties.

Fl.—Late May to late June. *Fr.*—About early August into September or October.

Middle District.—Hartford, Lindenwold.

Pine Barrens.—Forked River, Lakehurst, Chatsworth, Bear Swamp, Albion, Andrews, Malaga (P), Cedar Brook, Landisville.

Coast Strip.—Seaside Park (S), Surf City (L), Holgate's (L), Wildwood (UP).

Cape May.—Cape May (S).

***Rhus radicans* L. Poison Ivy.**

Pl. LXXX., Fig. 1.

Rhus radicans Linnæus, Sp. Pl. 266. 1753 [Virginia].—Britton 79.

Rhus toxicodendron Knieskern II.

Common in low woods and along fence rows; in the Northern, Middle and Coast districts; absent from the Pine Barrens, except as an incursion.

Fl.—Mid-May to mid-June. *Fr.*—About mid-August into September; often persisting after the perishing of the external fleshy coats, over winter into the next season.

Middle District.—Farmingdale, New Egypt, Fish House, Delair.

Pine Barrens.—Folsom (probably an incursion).

Coast Strip.—Peahala (L), Beach Haven Terrace (L), Anglesea (UP).

Cape May.—Cape May Ct. House.

***Rhus toxicodendron* L. Poison Oak.**

Rhus Toxicodendron Linnæus, Sp. Pl. 266. 1753 [Virginia and Carolina].

Sandy ground in the lower part of the Middle district and Cape May peninsula, spreading into the Pine Barrens as a rare straggler.

I am using the Linnaean names for this and the preceding in the sense in which they are employed in Britton's Manual; whether this application will be final or whether we may have more than these two forms I cannot say. This group is one which I am personally unable to study at close quarters. Dr. Mearns' paper (Pr. Biol. Soc., Wash. xv., 148, 1902) should be studied in this connection.

Fl.—Mid-May to mid-June, probably. *Fr.*—About mid-August into September, not long persistent.

Middle District.—Washington Park, Lawnside, Tomlin, Westville, Bridgeton, Fairton.

Pine Barrens.—Folsom, Woodbine (S).

Cape May.—Court House, Bennett.

Family ILICACEÆ. Hollies.

Key to the Species.

- a. Petals oblong or obovate, slightly united, stamens attached to them at their base.
 - b. Leaves thick, evergreen, persistent.
 - c. Leaves spiny-toothed, berries red. *Ilex opaca*, p. 539
 - cc. Leaves not spiny-toothed, oblanceolate, dotted beneath, berries black. *I. glabra*, p. 540
 - bb. Leaves thin, deciduous, berries red.
 - c. Calyx lobes distinctly fringed on the margin even in fruit, all flowers short pedicelled. *I. verticillata*, p. 540
 - cc. Calyx lobes not fringed, sterile flowers on long pedicels. *I. lævigata*, p. 541
- aa. Petals linear, distinct from each other and from the stamens, leaves elliptic, glabrous, sparsely-toothed, mucronate at tip, berries red. *Illicioides mucronata*, p. 541

ILEX L.

Ilex opaca Ait. Holly.

Ilex opaca Aiton, Hort. Kew. I. 169. 1789 [Carolina].—Pursh, Fl. Am. Sept. I. 117. 1814.—Willis 40.—Britton 75.—Keller and Brown 215.

Common in woods of the Middle and Coast districts, following the course of the rivers for some distance up into the Pine Barrens with other coastal plants. Reported from only three stations in the State north of our limits, in Warren, Mercer and Middlesex Counties.

The Holly is especially characteristic of the Coastal strip, and there it is that we find it rising to the full dignity of a tree, with trunk nearly or quite a foot in diameter, and its grayish-white bark gleaming through the masses of shining green leaves. Here, too, it produces berries most abundantly, and trees on protected ground are a gorgeous show during the autumn and winter.

The vandalism of the Christmas peddlers, mainly negroes, is largely responsible for the dwarfed, barren condition of most of the Holly of West Jersey, but the importation of vast quantities of Holly and Mistletoe from the south to Philadelphia has largely done away with this, as it is easier for venders to secure a supply from the wholesalers on the river front than to bring their own Holly from New Jersey. On the coast many of the

finest trees are cut down every year in effecting so-called improvements incident to the opening or enlarging of a seaside resort, but certain cottagers have carefully preserved the Hollies and enclosed them in their grounds.

Fl.—Late May to late June. *Fr.*—Late October into November, persisting over winter often into the following spring.

Middle District.—Farmingdale, New Egypt, Medford (S), Clementon, Camden (P), Red Bank, Washington Park, Woodbury, Swedesboro, Salem, Fairton.

Pine Barrens.—Landisville (T).

Coast Strip.—Sandy Hook, Seaside Park, Surf City (L), Barnegat City (L), Spray Beach (L), Beach Haven Terrace (L), Holgate's (L), Cox's Absecon, Atlantic City, Beesley's Pt. (S), Mays Landing (S), Palermo (S), Ocean City (S), Piermont (S), Holly Beach, Cape May, Cape May Pt. (S).

***Ilex glabra* (L.). Inkberry.**

Prinos glaber Linnæus, Suppl. 330. 1753 [Canada].

Ilex glabra Willis, 40.—Britton 75.

Common in moist sandy ground in the Pine Barrens, and locally elsewhere in our region. North of our limits it occurs only in Hudson County.

Fl.—Mid-June to early July. *Fr.*—Mid-September into October, persisting over winter into the following spring.

Middle District.—Shark River, New Egypt, Kaighns Pt. Albion, Kirkwood, Mickleton, Swedesboro, Millville.

Pine Barrens.—Allaire, Forked River, Pasadena, E. and W. Plains, Speedwell, Chatsworth, Browns Mills, Head of Batsto (S), Atsion (NB), Jackson, Cedar Brook, Landisville, Folsom, Hammonton, Egg Harbor City, Mouth of Batsto, Vineland, Somers Pt. (NB), Palermo.

Coast Strip.—Seaside Park, Harvey Cedars (L), N. Beach Haven (L), Spray Beach (L), Cox's, Beesley's Pt. (S), Anglesea (UP).

Cape May.—Dennisville (S), Bennett.

***Ilex verticillata* (L.). Black Alder. Winter-Berry.**

Prinos verticillata Linnæus, Sp. Pl. 330. 1753 [Virginia].

Ilex verticillata Willis 40.—Britton 75.

Swampy thickets throughout the State.

Fl.—Mid-June to early July. *Fr.*—Mid-September into October, persisting into winter.

Middle District.—Farmingdale, New Egypt, Birmingham, Pensauken (S), Medford (S), Asbury, Washington Park, Yorktown, Millville, Bridgeton (NB), Beaver Dam.

Pine Barrens.—Andrews, Cedar Brook, Landisville (T), Victoria (T).

Coast Strip.—Bayhead, Barnegat, Cox's, Ship Bottom (L), Surf City (L), Beach Haven Terrace (L), Holgate's (L), Beesley's Pt. (S), Court House (S), Bennett.

***Ilex lævigata* (Pursh.). Smooth Winter-Berry.**

Prinos lævigatus Pursh, Fl. Am. Sept. 220. 1814 [Alleghany Mts., N. Y. —Va.].

Ilex lævigatus Willis 40.—Britton 75.—Keller and Brown 216.

Common in swamps of the Pine Barren, Middle, Coast, and Cape May districts, extending north of our limits in Bergen. Hudson, Morris and Mercer Counties. Occasional on the coast.

Fl.—Late May to mid-June. *Fr.*—Early September to October, persisting into winter.

Middle District.—Keyport (C), Bordentown, Fish House, Kaighns Pt., Lindenwood, Westville (KB), Washington Park (S), Kirkwood (KB), Mickleton (H), Swedesboro (CDL), Glassboro, Millville, Beaver Dam, Dividing Creek.

Pine Barrens.—Toms River, Forked River, Dover Forge, Double Trouble, Pasadena, Lakehurst, Bamber, Jones Mill (S), Landisville, Pancoast, Egg Harbor City, Tuckahoe (S), Sea Isle Jnc.

Coast Strip.—Cox's Barnegat, Spray Beach (L).

Cape May.—Cape May (S).

ILICIOIDES Dumont.

***Illicioides mucronata* (L.). Mountain Holly.**

Vaccinium mucronatum Linnæus, Sp. Pl. 350. 1753 [North America].

Nemopanthes mucronata Willis 40.—Britton 75.

Illicioides mucronata Keller and Brown 216.

Reported from several localities in the northern counties, and locally southward in deep swamps in the Middle district and along the western edge of the Pine Barrens.

An associate of the *Rhododendron* at one, and probably all, of its stations in the cedar swamps of southern New Jersey, and originally driven southward, no doubt, by the same influence. Collected by Parker in the old Kaighn's Swamp May 5, 1866.

Fl.—Late April to early May. *Fr.*—Late July into August.

Middle District.—Kaighns Swp., Sicklerville, Glassboro, Ocean Co. (Kn).

Pine Barrens.—Williamstown Jnc., Atco, New Germany, Hammonton (C).

Family CELASTRACEÆ. Staff-trees.

Key to the Species,

- a. Leaves opposite, erect or decumbent shrubs.
 - b. Pods tuberculate, flowers greenish pink, twigs greenish, shrub 6-24 dm. high. *Evonymus americanus*, p. 542
 - bb. Pods smooth, flowers purple, 20-40 dm. high, often a small tree. *E. atropurpureus*, p. 542
- aa. Leaves alternate, a climbing, woody vine. *Celastrus scandens*, p. 543

EVONYMUS L.

Evonymus americanus L. Strawberry Bush.

Evonymus Americanus Linnæus, Sp. Pl. 197. 1753 [Virginia].—Willis 16.
—Britton 76.

Found at a number of localities in the northern half of the State, mainly on the coastal plain, and frequent southward in damp woodlands of the Middle and Cape May districts. Rare on the coast islands.

Few shrubs are more characteristic of low, dark woodlands of West Jersey. Although the blossoms are inconspicuous, the peculiar green coloration of the branches and stems, and the glossy leaves, make the plant easily recognizable, while in the autumn the bright red seeds and their crimson pod-like covering make bright spots of color in the leafless woods.

The variety *obovatus* is reported from Mickleton in Keller and Brown's List, but I have seen the specimens, and they do not differ from the typical form.

Fl.—Late May to mid-June. *Fr.*—Late September to late October.

Middle District.—Freehold (Willis), Keyport (C), Farmingdale, Pemberton (NB), Birmingham, Medford (S), Moorestown (NB), Washington Park, Wodbury, Sewell (S), Gloucester (P), Mickleton (NB), Swedesboro, Riddleton, Yorktown.

Coast Strip.—Anglesea (UP).

Cape May.—West of Anglesea Inc. (S), Cold Spring.

Evonymus atropurpureus Jacq. Burning Bush.

Evonymus atropurpureus Jacques, Hort. Vind. II. 55. Pl. 120. 1772 [N. America].—Britton 75.

Occasional through woods of the northern counties, mainly along the Delaware, and rare and local southward in the same vicinity to Salem County.

Middle District.—Moorestown (NB), Mullica Hill (H), Mannington (C), Elsinboro (C).

CELASTRUS L.

Celastrus scandens L. Climbing Bittersweet.

Celastrus scandens Linnæus, Sp. Pl. 196. 1753 [Cadada].—Britton 76.

Frequent in thickets in the northern counties and southward along the coastal island to Cape May; occasional in the Middle district.

Fl.—Late May to early June. *Fr.*—October, persisting through winter.

Middle District.—Camden (Bassett), Washington Park, Swedesboro.

Coast Strip.—Sandy Hook, Spring Lake (C), Atlantic City, Ocean City (S), Piermont (S), Holly Beach, Anglesea, Cold Spring (S).

Family STAPHYLEACEÆ. Bladder-nuts.

STAPHYLEA L.

Staphylea trifolia L. Bladder-nut.

Staphylea trifolia Linnæus, Sp. Pl. 270. 1753 [Virginia].—Knieskern 11.—Willis 16.—Britton 78.

Frequent in rocky woods of the northern counties; rare within our limits and only in the Middle district.

Fl.—Early May to late May. *Fr.*—July to August, persisting into October.

Middle District.—Squan (Kn), Camden Co., along the Delaware below Kaighns Pt. (P), Woodstown, Sharptown.

Family ACERACEÆ. Maples.

Key to the Species.

- a. Leaves 3- or 5-foliolate. *Acer negundo*, p. 545
- aa. Leaves simple, flowers in dense clusters, appearing before the leaves.
 - b. Petals none, flowers greenish, leaves deeply 5-lobed, samaras divergent, 5-7 mm. long. *A. saccharinum*, p. 544
 - bb. Petals present, flowers (and often ripe samaras) crimson, leaves 3-lobed or with two additional shorter basal lobes, samaras incurved, 1.5-2.5 cm. long.
 - c. Leaves small, with three short lobes, sparingly toothed and usually very pubescent below. *A. rubrum carolinianum*, p. 544
 - cc. Leaves larger, with 3-5 lobes, sharply toothed, usually nearly glabrous. *A. rubrum*, p. 544

ACER L.

Acer saccharinum L. White Maple.

Acer saccharinum Linnæus, Sp. Pl. 1055. 1753 [Pennsylvania].—Britton 78.

Common along the upper Delaware River, and sparingly southward within our limits. Frequently introduced as a shade tree.

Fl.—Mid-March to early April. *Fr.*—Early May to late May.

Middle District.—Delair.

Acer rubrum L. Red Maple.

Acer rubrum Linnæus, Sp. Pl. 1055. 1753 [Virginia and Pennsylvania].—Knieskern 11.—Britton 78.

Moist woodland; common in the Northern and parts of the Middle districts.

The Red Maples of our region are puzzling in their variability. We have a form with very small, three-lobed leaves, usually tomentous beneath, which is common in the Pine Barrens, which I have referred to *carolinianum*, while through the Middle district there is a tree with rather larger leaves, rarely tomentose, which may be referable to true *rubrum*. Some trees in the uplands of Pennsylvania are similar, but others, with large, five-lobed leaves, very white and glabrous below, are quite different. The division of specimens given below is arbitrary, but the difference between the extremes is striking.

Fl.—Late March to mid-April. *Fr.*—Early May to late May.

Middle District.—New Egypt, Medford (S), Springdale (S), Salem (S).

Acer rubrum carolinianum (Walt.). Carolina Red Maple.

Acer carolinianum Walter, Fl. Cor. 251 [S. Carolina].

Common throughout the Pine Barrens and on the Coast strip.

Fl.—Late March to mid-April. *Fr.*—Early May to late May.

Middle District.—Farmingdale, Birmingham, Pemberton Inc. (S), Bordentown, Haddonfield (S), Merchantville, Yorktown.

Pine Barrens.—Toms River, Bear Swamp, Speedwell, Pleasant Mills (S).

Coast Strip.—Pt. Pleasant, Seaside Park (S), Surf City (L), Sherburn's (L), Ocean City (S), Piermont (S).

Acer negundo L. Ash-leaved Maple. Box Elder.

Acer negundo Linnæus, Sp. Pl. 1056. 1753 [Virginia].—Willis 17.
Negundo aceroides Britton 78.

Banks of streams at a number of stations in the northern part of the State, mainly on the Delaware and Hackensack; occasional within our limits on tributaries of the Delaware, also often escaped from cultivation.

Fl.—Mid April to early May. *Fr.*—Apparently late August into September.

Middle District.—Crosswicks, Red Bank (Willis), New Egypt, Pemberton (C), Mantua (H), Mullica Hill (NB), Swedesboro.

Family BALSAMINACEÆ. Jewel-weeds.*Key to the Species.*

- a. Flowers orange, mottled with darker spots, spur incurved. *Impatiens biflora*, p. 545
 aa. Flowers pale yellow, spur short, spreading. *I. pallida*, p. 545

IMPATIENS L.***Impatiens biflora* Walt. Spotted Touch-me-not.**

Impatiens biflora Walter, Fl. Car. 219. 1788 [S. Carolina].—Knieskern 10.
 —Willis 15.—Britton 74.

Common or frequent in swampy ground throughout the State, except in the Pine Barrens.

Fl.—Late July into October.

Middle District.—New Egypt, Hartford, Springdale, Fish House, Medford (S), Haddonfield (S), East of Clementon (S), Salem (S).

Coast Strip.—Pt. Pleasant (S), Toms River (Kn), Forked River, Manahawkin, Barnegat City (L), Surf City (L), Palermo (S), Mays Landing (S), Seville (S), Holly Beach (UP).

Cape May.—Cold Spring (S).

***Impatiens pallida* Nuttall. Pale Touch-me-Not.**

Impatiens pallida Nuttall. Gen. II. 145. 1818 [vicinity of Philadelphia].
Impatiens aurea Britton 73.

Swampy ground in the northern counties; not common. Reported within our limits at Moorestown, where it was found by Miss A. M. Kaighn.

Middle District.—Moorestown (NB).

Order RHAMNALES.

Family RHAMNACEÆ. Buck-thorns.

Key to the Species.

- a. Fruit a berry, flowers greenish, in clusters. [*Rhamus cathartica* L.]*
 aa. Fruit dry, splitting into three nutlets, flowers white in terminal, umbel-
 like clusters, forming a showy panicle. *Ceanothus americanus*, p. 546

CEANOTHUS L.

Ceanothus americanus L. New Jersey Tea.

Ceanothus americanus Linnæus, Sp. Pl. 195. 1753 [Virginia and Carolina].
 —Barton, Fl. Phila. I. 126. 1818.—Knieskern II.—Britton 77.

In open woods; common in the northern counties and occasional southward in the Middle and Cape May districts.

Fl.—Early June to early July. *Fr.*—Mid-July to late August.

Middle District.—New Egypt, Pemberton (Bassett), Medford (S), Had-
 donfield (S), Westville, Lawnside (S), Woodbury (NB), Yorktown.

Cape May.—Cold Spring.

Family VITACEÆ. Grapes.

Key to the Species.

- a. Leaves digitate, 5-7 foliate. *Psedera quinquefolia*, p. 548
 aa. Leaves not compound, entire or deeply lobed.
 b. Leaves velvety-tomentose on the under surface.
 c. A tendril or branch of inflorescence opposite each of several suc-
 cessive leaves. *Vitis labrusca*, p. 546
 cc. Tendrils intermittent, none opposite each third leaf.
V. æstivalis, p. 547
 bb. Leaves glabrous, or short-hairy on the veins beneath.
 c. Teeth of leaves narrowly deltoid or even lanceolate, sharply acumi-
 nate, often falcate; berries blue with a bloom, stipules over 4 mm.
 long. *V. vulpina*, p. 547
 cc. Teeth of leaves broadly deltoid, cuspidate; berries black and shin-
 ing, stipules 4 mm. long or less. *V. cordifolia*, p. 547

VITIS L.

Vitis labrusca L. Fox Grape.

Vitis Labrusca Linnæus, Sp. Pl. 203. 1753 [North America].—Knieskern II.
 —Britton 77.

* Buckthorn, escaped from cultivation in some places.

Swampy thickets; common in the northern counties and less common southward in the Middle and Coast districts. A form with green instead of purplish fruit occurs occasionally in West Jersey.

Fl.—Late May to mid-June. *Fr.*—Early September into October.

Middle District.—Shark River, Farmingdale (S), New Egypt, Medford (S), Lindenwold (S), Camden, Washington Park.

Coast Strip.—Pt. Pleasant (S), Forked River, Manahawkin, Beach Haven Terrace (L), Holgate's (L), Wildwood (UP), Cape May Court House (S).

***Vitis aestivalis* Michx. Summer Grape.**

Vitis aestivalis Michaux, Fl. Bor. Am. II. 230. 1803 [Virginia and Carolina].—Knieskern II.—Britton 77.

Common in thickets throughout the State, except in the Pine Barrens, where it is only occasional, and probably of recent introduction.

Fl.—Mid-June to early July. *Fr.*—Early September into October.

Middle District.—Holmdel (NB), Fish House (S), Medford (S), Locust Grove (S), Tomlin (S), Sicklerville, Eight miles east Mickleton, Swedesboro, Washington Park, Berlin (S), Yorktown.

Pine Barrens.—Lakehurst, Speedwell, Sumner, Landisville (T), Mays Landing (S).

Coast Strip.—Waretown, Surf City (L), Staffordville, Atlantic City, Pleasantville (NB), Ocean City (S), Palermo (S), Anglesea, Piermont, Bennett, Cold Spring (S).

***Vitis cordifolia* Michx. Chicken Grape, Frost Grape.**

Vitis cordifolia Michaux, Fl. Bor. Am. II. 231. 1803 [Penna. to Fla.].—Knieskern II.—Britton 77.

Frequent in the northern counties, less common southward in the Middle district, rarely on the coast.

Fl.—Early June to late June. *Fr.*—Late September into October.

Middle District.—Holmdel (NB), Keyport (C), New Egypt, Fish House, Swedesboro.

Coast Strip.—Forked River.

***Vitis vulpina* L. River-bank Grape.**

Vitis vulpina Linnæus, Sp. Pl. 203. 1753 [Virginia].

Vitis riparia Britton 77.

Gravelly shores of the upper Delaware river associated with *Salix interior*, a plant of similar habitat; very rare within our limits.

Fl.—Late May to mid-June, probably. *Fr.*—Mid-August into September.

Middle District.—Fish House.*

PSEDERA Hecker.†

Psedera quinquefolia (L.). Virginia Creeper.

Pl. LXXX., Fig. 2.

Hedera quinquefolia Linnæus, Sp. Pl. 202. 1753 [Canada].

Cissus Hederacea Barton Fl. Phila. I. 118. 1818.

Ampelopsis quinquefolia Knieskern 11.

Vitis quinquefolia Britton 77.

Common in woods and thickets throughout the State, except in the Pine Barrens, where it is rare and apparently of recent introduction. On the coast islands it flourishes on the edge of Bay Berry thickets, directly back of the dunes.

Fl.—Late June to late July. *Fr.*—Late September into October.

Middle District.—Farmingdale, New Egypt, Washington Park, Medford (S).

Pine Barrens.—Pancoast (S), Pleasant Mills (apparently introduced).

Coast Strip.—Sandy Hook (NB), Pt. Pleasant (S), Forked River, Peahala (L), Ship Bottom (L), St. Albans (L), Beach Haven Terrace (L), Beach Haven (L), Barnegat City (L), Longport (S), Ocean City (S), Piermont (S).

Cape May.—Bennett, Cold Spring (S), Cape May (S).

Order MALVALES.

Family TILIACEÆ. Lindens.

TILIA L.

Tilia americana L. Linden, Basswood.

Tilia americana Linnæus, Sp. Pl. 514. 1753 [Virginia and Canada].—Knieskern 10.—Willis 14.

Common in woods of the northern counties, and occasional southward in the Middle district.

* The record for Westville (KB) was an error.

† Cf. Rehder *Rhodora* 1908, p. 24, for discussion of the generic name of this plant.

Fl.—Late June to early July. *Fr.*—About August, persisting into autumn.

Middle District.—Squan (Kn), Cliffwood (NB), Farmingdale, New Egypt, Washington Park, Salem Co. on the Delaware (NB).

Family MALVACEÆ. Mallows.

Key to the Species.

- a. Stamen column, bearing anthers at the summit.
 - b. Style branches with stigmas on their inner side, leaves orbicular reniform, flowers bluish white. [*Malva rotundifolia* L.]*
 - bb. Style branches with stigmas at their apex, flowers yellow.
 - c. Leaves ovate or oblong lanceolate, with a small tubercle at the base of many of the petioles; 3-6 dm. high. [*Sida spinosa*]†
 - cc. Leaves cordate, ovate-orbicular densely velvety pubescent, plant 10-20 dm. high. [*Abutilon abutilon* L.]‡
- aa. Stamen column bearing anthers below the entire or five-toothed summit.
 - b. Flowers rose colored, 5 cm. broad. *Kosteletzkya virginica*, p. 549
 - bb. Flowers pink or white, with or without a crimson center, 10-20 cm. broad. *Hibiscus moscheutos*, p. 550

KOSTELETZKYA Presl.

Kosteletzkya virginica (L.). *Kosteletzky's Mallow.*

Hibiscus virginica Linnaeus, Sp. Pl. 697. 1753 [Virginia].—Pursh, Fl. Am. Sept. II. 456. 1814.

Kosteletzkya virginica Knieskern 10.—Willis 14.—Britton 70.—Keller and Brown 221.

Edge of the salt marshes on the coast and bay shore; common in Cape May County; local and less common farther north.

This mallow is a conspicuous feature of the mid-summer coast marshes, its broadly branching stems with their numerous pink flowers adding quite a touch of color, although not nearly so conspicuous as the following species. Unlike it, the *Kosteletzkya* never strays from the vicinity of the salt marshes.

Fl.—Early August to early September. *Fr.*—Late August to late September.

Maritime.—Avon (KB), Mantoloking (NY), Lavalette (KB), Forked River, Seaside Park, Island Hts. (NB), Waretown (C), Beach Haven Terrace (L), Surf City (L), Holgate's (L), Barrel Isl. (L), Manahawkin, Brigantine Beach (NB), Atlantic City, Ventnor (KB), Beesley's Pt. (S), Palermo, Ocean City (S), Avalon, Piermont, Wildwood, Anglesea (S),

* Dwarf Mallow, a common weed in cultivated and waste ground.

† Prickly Sida, a weed in waste ground.

‡ Velvet-leaf Mallow, a weed in waste ground.

Holly Beach, Clermont, Cape May Court House, Cape May, Cape May Pt. (S), Dennisville (S).*

HIBISCUS L.

Hibiscus moscheutos L. Rose Mallow, Swamp Mallow.

Pl. LXXXI.

Hibiscus Moscheutos Linnæus, Sp. Pl. 693. 1753 [Canada and Virginia].—Knieskern 10.—Willis 14.—Britton—70.

Several stations in the northern counties; along streams and marshes, but apparently never encroaching beyond the fall line for any distance. Very common southward along the Delaware River and the coast marshes.

The flowering of the Mallows on the coast and river marshes is perhaps the most extensive display of color that the flora of our region presents. Throughout the month of August they form great masses of pink and white bloom, which can be seen at a long distance, and seem to be laid out over the swamps like flower beds in a garden.

The flowers are either pink or white, with or without a crimson eye. Only one style occurs on any given plant, but the plants are usually mixed together indiscriminately, and show, besides differently colored flowers, considerable difference in the shape of the leaves, pods and calyx-lobes. Dr. N. L. Britton has described as distinct *H. oculiroseus* (c. f. Jour. N. Y. Bot. Garden, iv. 220, 1903) from a plant of the "Crimson-Eye," cultivated and introduced into the nursery trade by Mr. William Bassett, of Hammonton, N. J., from an original plant obtained at Absecon. The wild plants now growing there, however, are normal *H. moscheutos*, and I regard Dr. Britton's species as a sport due to cultivation, not a native member of the New Jersey flora.

Fl.—Late July to early September. *Fr.*—Late September through autumn.

Middle District.—Fish House, Kaighns Pt., W. Deptford, Medford, Pennsgrove, Swedesboro, Salem (S), Beaver Dam.

Coast Strip.—Barnegat Pier, Barnegat City (L), Brant Beach (L), Surf City (L), Beach Haven Terrace (L), Absecon, Atlantic City (S), Ocean City (S), Sea Isle City, Avalon, Piermont (S), Wildwood, Holly Beach, Clermont, Tuckahoe (T), Cape May Court House, Cold Spring (S), Cape May (S), Cape May Pt. (S).

*The record for Hancock's Bridge (KB), on authority of Miss Cora A. Ware, has not been verified and seems unlikely.

Order PARIETALES.

Family HYPERICACEÆ. St. John's-worts.

- a. Sepals 4, one pair narrower than the other, petals 4, yellow.
 - b. Plant low, 1-2.5 dm. high, leaves sessile, flowers 15-25 mm. broad.
 - Ascyrum hypericoides*, p. 552
 - bb. Plant taller, 3-6 dm. high, leaves clasping, flowers 12-18 mm. broad.
 - A. stans*, p. 552
- aa. Sepals and petals 5.
 - b. Petals yellow.
 - c. Leaves reduced to minute appressed scales.
 - Sarothra gentianoides*, p. 557
 - cc. Leaves not reduced to scales.
 - d. Styles 5, flowers 40-60 mm. broad. *Hypericum ascyron*, p. 552
 - dd. Styles 3 (rarely 4).
 - e. Stamens numerous, always more than 12.
 - f. Shrubby, 5-20 dm. high, flowers 8-12 mm. broad.
 - H. densiflorum*, p. 553
 - ff. Not shrubby, 2-9 dm. high.
 - g. Stamens in three to five clusters, petals with black dots or lines.
 - h. Leaves oblong or linear, 10-20 mm. long, dots only in the margin of the petals.
 - [*H. perforatum*]*
 - hh. Leaves oblong, 20-80 mm. long, several rows of dots or lines on the petals. *H. punctatum*, p. 555
 - gg. Stamens not in clusters, petals without black dots.
 - h. Leaves lanceolate or oblong, margins revolute.
 - H. adpressum*, p. 553
 - hh. Leaves elliptic or oval, spreading, flowers pale yellow.
 - H. ellipticum*, p. 554
 - hhh. Leaves oval, erect and appressed, flowers copper yellow.
 - H. virgatum ovalifolium*, p. 554
 - ggg. Stamens 5-12.
 - h. Flowers small, usually 4-5 mm. broad.
 - i. Cyme leafy-bracted, leaves elliptic.
 - H. boreale*, p. 555
 - ii. Cyme subulate-bracted.
 - j. Leaves ovate, oblong or elliptic.
 - H. mutilum*, p. 555
 - jj. Leaves ovate deltoid.
 - H. gymnanthum*, p. 556
 - jjj. Leaves linear obtuse. *H. canadense*, p. 556
 - hh. Flowers 6-10 mm. broad, plants 3-9 dm. high.
 - H. majus*, p. 556
 - bb. Petals red purple, leaves ovate obtuse, plant 3-5 dm. high.

* Common St. John's-wort, a weed.

c. Leaves sessile, flower-clusters peduncled.

Triadenum virginicum, p. 557

cc. Leaves petioled, flower-clusters nearly sessile.

T. petiolatum, p. 558

ASCYRUM L.

Ascyrum stans Mich. **St. Peter's-wort.**

Ascyrum stans Michaux, Fl. Bor. Am. II. 77. 1803 [Carolina].—Knieskern 8.—Willis 11.—Britton 66.—Keller and Brown 223.

Ascyrum hypericoides Pursh, Fl. Am. Sept. II. 374. 1814.—Barton, Fl. Phila. II. 13. 1818.

Damp or dry sandy ground; common in the Pine Barrens; occasional in the Cape May district and rare and local in West Jersey.

Fl.—Late July to early September. *Fr.*—Late October through autumn.

Middle District.—Merchantville (P), Mickleton (NB), Dividing Creek.

Pine Barrens.—Four miles south New Egypt, West Creek (S), Manchester, Waretown, Dover Forge, Bamber, Chatsworth, Speedwell (S), Bear Swamp, Mouth of Batsto (S), Pleasant Mills, Hammonton, Egg Harbor City, Mays Landing, Weymouth (T), Tuckahoe, Browns Mills (P), Quaker Bridge (P), Absecon, Hamilton Mon. Co. (C).

Cape May.—Ct. House, Cold Spring (S), Town Bank (OHB).

Ascyrum hypericoides L. **St. Andrew's Cross.**

Ascyrum Hypericoides Linnæus, Sp. Pl. 788. 1753 [Virginia].—Keller and Brown 223.

Ascyrum multicaule Barton, Fl. Phila. II. 13. 1818.

Ascyrum Crux-Andree Pursh, Fl. Am. Sept. II. 373.—Britton 66.—Knieskern 66.

Common in dry sandy soil of the coastal plain at several stations north of our limits and throughout the Middle, Cape May, Coast and Pine Barren districts.

Fl.—Early July to early September. *Fr.*—Early September through autumn.

Middle District.—Keyport (NB), Asbury Park (P), Brindletown, Arney's Mt. (S), Camden (P), Medford (S), Oaklyn (S), Westmont (S), Washington Park, Jericho (NB), Bridgeton (NB), Dividing Creek.

Pine Barrens.—Forked River, Chatsworth, Bear Swamp, Clementon (S), Landisville, Mouth of Batsto (S), Pleasant Mills, Egg Harbor City, Mays Landing (S).

Coast Strip.—Beach Haven (L), Surf City (L), Ship Bottom (L).

Cape May.—Green Creek (S), Cold Spring, Cape May (S).

HYPERICUM L.

Hypericum ascyron L. **Giant St. John's-wort.**

Hypericum Ascyron Linnæus, Sp. Pl. 783. 1753 [Canada].—Britton 67.—Keller and Brown 224.

Limited to the valley of the upper Delaware, just entering our limits at Bordentown, where it is reported in Britton's Catalogue on the authority of Mr. Stowell.

Fl.—Early July to late July. *Fr.*—Early September into October.

***Hypericum densiflorum* Pursh. Shrubby St. John's-wort.**

Hypericum densiflorum Pursh, Fl. Am. Sept. 376. 1814 [Virginia Mts.].—Britton 67.—Keller and Brown 224.

Hypericum prolificum var. *densiflorum* Knieskern 8.—Willis 11.

Hypericum prolificum Britton 67 (in part).

Plentiful in damp spots in the Pine Barrens, rare and local in the Middle district.

H. prolificum is reported in Britton's Catalogue, but I feel convinced that all the coastal plain plants of New Jersey are referable to *H. densiflorum*. Specimens from three of the localities prove to belong to this species, and I have little doubt that the records for Manchester, Freehold and Pemberton are based on the same. There is some variation both in the size of the flowers and density of the inflorescence, but I have seen no specimens at all referable to *H. prolificum*, as we have it in the Susquehanna valley in Pennsylvania.*

Fl.—Early July to early September. *Fr.*—Early October through autumn.

Middle District.—Shark River, Pt. Pleasant, New Egypt, Lindenwold.

Pine Barrens.—Toms River, Island Hts., Cassville, Woodmansie, Hanover, Browns Mills, Chatsworth, Speedwell (S), Pasadena, Parkdale, Tuckerton, Bear Swamp, Kenilworth, Clementon, Ballengers Mill, Braddocks Mill, Taunton, Sicklerville, Winslow Jnc., Winslow (S), Folsom, Eighth St. (T), Hammonon, Pleasant Mills, Egg Harbor City, Mays Landing, Weymouth, Woodbine, Millville.

***Hypericum adpressum* Barton. Barton's St. John's-wort.†**

Hypericum adpressum Barton, Comp. Fl. Phila. II. 15. 1818 [Lansdowne, on the Schuylkill, above Buck's Isl., Phila.].—Willis 11.—Britton 67.—Keller and Brown 224.

* cf. Sargent Garden and Forest, 1890, 524.

† Discovered by Wm. P. C. Barton (1786-1856), Professor of Botany at the University of Pennsylvania, and author of the *Compendium Florae Philadelphiae*. Probably the first botanist of this vicinity to conduct weekly field trips.

Hypericum galioides Pursh, Fl. Am. Sept. II. 376. 1814 (as to N. J. records).

Open swamps; confined to the Middle and Cape May districts, occurring north of our limits only at several stations in Bergen County. The statement of Torrey and Gray that it occurs in the Pine Barrens is not substantiated, and is no doubt due to the loose use of the term to cover all of southern New Jersey.

Fl.—Early July to late August. *Fr.*—Mid-September through autumn.

Middle District.—Burlington, Delanco, Florence, Moorestown (KB), Union Grove.

Coast Strip?—Mays Landing (CDL).

Cape May.—Bennett, Cold Spring, Cape May (S).*

***Hypericum ellipticum* Hook. Pale St. John's-wort.**

Hypericum ellipticum Hooker, Fl. Bor. Am. I. 110. 1830 [Canada to Lake Winnepeg].—Britton 67.—Keller and Brown 224 (in part).

Confined to the upper Delaware valley in swampy ground and bogs, locally southward to Camden.

Fl.—Mid-June to early July. *Fr.*—Late August into October.

Middle District.—Burlington (P), Kaighns Pt., Camden (C).†

***Hypericum virgatum ovalifolium* Britton. New Jersey St. John's-wort.**

Hypericum virgatum var. *ovalifolium* Britton, Trans. N. Y. Acad. IX. 10. 1889 [Pine Barrens of N. J.].—Britton 67.

Hypericum angulosum Muhlenberg, Cat. 68. 1813.—Pursh, Fl. Am. Sept. II. 378. 1814.—Knieskern 8.—Willis 11.

Hypericum virgatum Keller and Brown 224.

Frequent in bogs and swamps of the Pine Barrens and Cape May peninsula; rare and local in Pine Barren islands in the Middle district.

The peculiar coppery color of the flowers distinguishes this from any of the other species of our range.

Fl.—Mid-July to early September. *Fr.*—Late September through autumn.

* I have grave doubts about the record for Freehold, given by Britton on authority of Willis, and there is no specimen to substantiate it. Keller and Brown's records for Egg Harbor, Atco and Mays Landing are probably *H. densiflorum*.

† The records in Keller and Brown for Egg Harbor and Mays Landing, and probably for Pt. Pleasant, are based on *H. v. ovalifolium*.

Middle District.—Union Grove.

Pine Barrens.—Spring Lake (NB), Pt. Pleasant, Speedwell (S), Atsion, Parkdale, Hammonton, Egg Harbor City, Mullica River, Quaker Bridge, Pleasant Mills (NB), Batsto, Mouth of Batsto, Woodbine, Belleplain (S).

Cape May.—Court House (S), Bennett (S), Cold Spring (S), Nummerytown (S).*

***Hypericum punctatum* Lam. Spotted St. John's-wort.**

Hypericum punctatum Lamarck, Encycl. IV. 164 1796 [Typ. Loc. unknown].

Hypericum maculatum Britton 68.

Hypericum corymbosum Knieskern 8.

Frequent in low grounds in the northern counties and occasional in the Middle and Cape May districts.

Fl.—Early July to early August. *Fr.*—Early September into October.

Middle District.—Farmingdale, New Egypt, Delair, Mickleton, Swedesboro, Centerton (S).

Pine Barrens.—Ancora (Bassett) introduced?

Cape May.—Cold Spring (OHB).

***Hypericum mutilum* L. Dwarf St. John's-wort.**

Hypericum mutilum Linnaeus, Sp. Pl. 787. 1753 [Virginia and Canada].—Knieskern 8.—Britton 68.

Common in low grounds throughout the State, except in the Pine Barrens.

Fl.—Early July to early September. *Fr.*—Mid-September through autumn.

Middle District.—New Egypt, Birmingham, Pemberton Jnc. (S), Morris, Clementon, Blackwood, Lawnside (S), Swedesboro, Riddleton, Dividing Creek.

Coast Strip.—Sandy Hook (NB), Seaside Park, Manahawkin, Barnegat City (L), Barnegat City Jnc. (L), Holgate's (L), Absecon (S), Atlantic City (S), Beesleys Pt. (S), Ocean City (S), Palermo (S), Holly Beach (UP).

Cape May.—Three miles west Court House.

***Hypericum boreale* (Britton). Northern St. John's-wort.**

Hypericum Canadense boreale Britton, Bull. Torrey Bot. Club XVIII. 367. 1891. n. n. for *H. C. minimum* Gray [Wisconsin].

* There is no specimen to substantiate the record for Anglesea, given by Keller and Brown, and exhaustive collections from the same vicinity have failed to discover it.

Frequent in boggy locations in the northern counties; south along the coast and occasional in the Middle district and Pine Barrens in boggy situations.

Fl.—Early July to early September, probably. *Fr.*—Mid-September through autumn.

Middle District.—Delanco.

Pine Barrens.—Folsom.

Coast Strip.—Seaside Park, Forked River, Peahala (L), Beach Haven Terrace (L), Barnegat City (L), Sherburn's (L), Holgate's (L), St. Albans (L), Holly Beach (UP).

Cape May.—Cold Spring (S).

***Hypericum gymnanthum* Engelm. and Gray. Clasping-leaved St. John's-wort.**

Hypericum gymnanthum Engelm. and Gray, Bost. Jour. Nat. Hist. V. 212. 1847 [Houston, Tex.].—Britton 68.—Keller and Brown 224.

Low ground; occasional in the lower Middle district.

First detected in the State by Mr. Benjamin Heritage at Mickleton in 1887, and collected later at Medford by Mr. Stewardson Brown and the writer July 27, 1902.

Flowers—and immature fruit July 27.

Middle District.—Medford, Mickleton (H).

***Hypericum majus* (A. Gray). Larger Canada St. John's-wort.**

Hypericum Canadense var. *major* Gray, Man. Ed. V. 86. 1867 [Lake Superior, Southern N. Y. and southward].—Britton 68.

Recorded in Britton's Catalogue from Hudson and Sussex Counties, and once collected near Camden by Mr. C. F. Parker September 7, 1862. I have examined Mr. Parker's specimen, which is still in his herbarium, now at Princeton University, and there is no question as to the correctness of his identification.

Mature fruit September 7.

Middle District.—Camden (P).

***Hypericum canadense* L. Canada St. John's-wort.**

Hypericum canadense Linnæus, Sp. Pl. 785. 1753 [Canada].—Knieskern 8. —Britton 68.

Common in damp sandy soil throughout the coastal plain, but not abundant in the northern counties.

The most abundant small St. John's Wort found in the Pine Barrens.

Fl.—Early July to early September. *Fr.*—Mid-September through autumn.

Middle District.—Red Bank (NB), New Egypt, Medford, Lawnside (S), Swedesboro, Dividing Creek.

Pine Barrens.—Allaire, Speedwell (S), Parkdale, Albion, Williamstown Jnc., Landisville, Mouth of Batsto, Tuckahoe (S).

Coast Strip.—Pt. Pleasant, Long Branch, Manahawkin, Ship Bottom (L), Barnegat City (L), Peahala (L), Spray Beach (L), Holgate's (L), Palermo.

Cape May.—Court House (S).

SAROTHRA L.

Sarothra gentianoides L. Orange Grass.

Pl. LXXXII., Fig. 1.

Sarothra Gentianoides Linnæus, Sp. Pl. 272. 1753 [Virginia and Pennsylvania].

Hypericum sarothra Knieskern 8.

Hypericum gentianoides Britton 68.

Sandy ground; common throughout the State, often occurring on roadsides and railroad embankments, like a weed.

Fl.—Mid-July to mid-September. *Fr.*—Late September through autumn.

Middle District.—New Egypt, Clementon, Swedesboro.

Pine Barrens.—Bear Swamp (S), Landisville (T), Hammonton (S), Egg Harbor City, Tuckahoe, Tuckerton (S).

Coast Strip.—Asbury Park (P), Pt. Pleasant, Island Heights, Spray Beach (L), Atlantic City (S), Wildwood.

Cape May.—Cold Spring (S).

TRIADENUM Rafinesque.

Triadenum virginicum (L.). Pink St. John's-wort.

Hypericum virginicum Linnæus, Sp. Pl. 2nd. Ed. 1104. 1763 [Pennsylvania]. Britton 68.

Open swamps; common throughout the State.

A characteristic plant of every bog.

Fl.—Early August to early September. *Fr.*—Mid-September into October.

Middle District.—New Egypt, Fish House, Kaighns Pt., Washington Park (S), W. Deptford, Bridgeport, Dividing Creek.

Pine Barrens.—Jones Mill (S), Speedwell (S), Bear Swamp (S), Clementon (S), Ancora (P), Parkdale (S), Quaker Bridge (NB), Vineland (T), Egg Harbor City, Tuckahoe (S).

Coast Strip.—Long Branch, Seaside Park, Peahala (L), Spray Beach (L),

Holgate's (L.), Absecon (S), Ocean City (S), Wildwood.

Cape May.—Bennett (S), Cape May.

Triadenum petiolatum (Walt.). **Large Pink St. John's-wort.**

Hypericum petiolatum Walter, Fl. Car. 191. 1788 [S. Carolina].—Britton 68.
—Keller and Brown 225.

The occurrence of this species in New Jersey rests on a fragment in the herbarium of the Philadelphia Academy labeled "near Camden," from the herbarium of J. K. Potts. Torrey and Gray's statement that it occurs in the State (Flora. N. A., i, 168) is no doubt based on the same specimen.

Family ELATINACEÆ. Waterworts.

ELATINE L.

Elatine americana (Pursh.). **Waterwort.**

Peplis americana Pursh, Fl. Am. Sept. 238. 1814 [Pennsylvania].

Crypta minima Nuttall, Jour. Acad. Nat. Sci., Phila., I. 117. 1817.—[Shores of Delaware, above Phila.].—Barton, Fl. Phila. I. 17. 1818.

Elatine Americana Britton 66.

Reported on muddy shores of the Passaic River and Lake Hopatcong; also on the Delaware at Camden and along the upper coast and in the Pines.

Fl.—Early July well into autumn.

Middle District.—Camden, in mud, Delaware river (P).

Coast Strip.—Bayhead, Spring Lake, Pt. Pleasant.*

Pine Barrens.—Lakehurst (Mackenzie), 8 miles south of Manchester (P), Ferago Pond (C).

Family CISTACEÆ. Rock-rose, etc.

Key to Species.

a. Petals 5, yellow, showy.

b. Leaves lanceolate or oblong, flowers 15-30 mm. broad.

c. Petaliferous flowers 5-12, in a short terminal cymose raceme, their capsules 3-4 mm. long, little, if at all, surpassed by later branches; capsules of later apetalous, flowers 1 mm. in diameter.

Helianthemum majus, p. 559

cc. Petaliferous flowers 1-2, their capsules 6-8 mm. long, much overtopped by later branches, capsules of apetalous flowers often 3-4 mm. in diameter.

H. canadense, p. 560

bb. Leaves subulate or scale like, imbricated; flowers about 8 mm. broad, plant 1-2 dm. high.

* The record for Wenonah (Githens) in Keller and Brown's list has not been verified.

c. Greenish, soft pubescent, leaves subulate, 6-8 mm. long.

Hudsonia ericoides, p. 561

cc. Pale, hoary pubescent, leaves 2 mm. long, appressed.

H. tomentosa, p. 560

aa. Flowers very small, greenish or purplish, numerous in panicles, stem leaves minute and entire, horizontal basal leafy shoots develop late in the season, often with broader leaves.

b. Leaves on basal shoots oblong to ovate, not three times as long as broad.

c. Pubescence of the stem spreading, panicle dense.

Lechea villosa, p. 563

cc. Pubescence of the stem appressed, panicle more open.

d. Outer sepals exceeding the inner.

L. minor, p. 562

dd. Outer sepals shorter than the inner.

e. Fruiting heads obovoid, pyriform, basal shoots green.

L. racemulosa, p. 562

ee. Fruiting heads subglobose, basal shoots hoary, pubescent.

L. maritima, p. 563

bb. Leaves on basal shoots narrowly lanceolate to linear.

c. Inner sepals 1-nerved, usually exceeded by the outer ones, stem leaves narrowly linear.

L. tenuifolia, p. 563

cc. Inner sepals 3-nerved, equalling or longer than the outer ones.

d. Plant canescent pubescent.

L. maritima, p. 563

dd. Plant green.

L. leggettii, p. 563

HELIANTHEMUM Persoon.

The flowers are of two kinds; large showy petaliferous blossoms appearing early, and small, practically apetalous ones, appearing later and bearing much smaller capsules. Some specimens in the latter stage resemble certain species of *Lechea*.

Helianthemum majus (L.). Hoary Frostweed.

Lechea major Linnæus, Sp. Pl. 90. 1753 [Canada].

Helianthemum corymbosum Barton, Fl. Phila. II. 7. 1818.—Willis 10.—Britton 53.

Helianthemum ramuliflorum Pursh, Fl. Am. Sept. II. 363. 1814.—Barton, Fl. Phila. II. 7. 1818.

Dry sandy soil; common throughout our region, except in the Pine Barrens.

Fl.—(Petaliferous) Late May to late June. *Fr.*—(Of apetaliferous flowers) Early July to early September.

Middle District.—Farmingdale (S), Arney's Mt. (S), Pemberton (NB), New Egypt, Medford, Haddonfield (C), Clementon, Griffith's Swamp, Tomlin, Woodbury, Swedesboro, Centerton (S).

Coast Strip.—Asbury Park, Como, Palermo.

Cape May.—Seaville, Court House, Anglesea Inc. (S), Bennett.

Helianthemum canadense (L.). Frostweed.

Cistus canadensis Linnæus, Sp. Pl. 526. 1753 [Canada].

Helianthemum canadense Barton, Fl. Phila. II. 6. 1818.—Knieskern 7.

Helianthemum majus Britton 53.

Common in dry sandy soil throughout the State, especially abundant in the Pine Barrens.

As the apetalous flowers begin to develop the plant looks very much like a large flowered *Lechea*.

Fl.—(Petaliferous) Early May to late July. *Fr.*—(Of apetaliferous flowers) Early August to early October.

Middle District.—Hartford, Medford (S), Camden, Mickleton, Swedesboro.

Pine Barrens.—Farmingdale, Lakehurst, Browns Mills, Whittings, E. and W. Plains (S), Speedwell, Applepie Hill (S), Clementon (S), Summer, Albion, Atco, Landisville, Cain's Mill, Folsom, Pleasant Mills, Mays Landing (S), Absecon.

Cape May.—Court House, Bennett, Cape May Pt. (S).

Helianthemum corymbosum Michx. Pine Barren Frostweed.

Helianthemum corymbosum Michaux, Fl. Bor. Am. I. 307. 1803 [Carolina and Georgia].

This plant has been credited to New Jersey by several writers, but the only specimen from that State that proves to belong to this species is one of Nuttall's, in the Philadelphia Academy herbarium. I have a strong suspicion that two or three of Nuttall's specimens, notably *Chondrophora virgata*, which are labeled New Jersey, really came from farther south, and perhaps that is the case with the present plant. At all events, diligent search has failed to discover another specimen. Nuttall's label is simply "N. Jersey." Dr. Britton says: (Ill. Flora, ii, p. 440) "Specimens [from N. J.] so called, prove to be *H. canadense*," but the Nuttall plant is certainly *corymbosum*.

HUDSONIA L.

Hudsonia tomentosa Nutt. Woolly Hudsonia, Beach Heather.

Hudsonia tomentosa Nuttall, Gen. II. 5. 1818 [Coast of N. J., Del. and Md.].

—Knieskern 7.—Willis 10.—Britton 54.—Keller and Brown 226.

Common on sands of the seacoast and occasional in the Pine Barrens.

This low, white, woolly shrub, seldom over six inches in height, forms patches of considerable extent over the wind-swept sand dunes of the coast, which it so closely resembles in color as to be inconspicuous, except in late spring, when its branches are covered with the little starry yellow blossoms. Like a few other maritime species, notably *Lechea maritima*, it strays inland here and there in the white sand of the Pine Barrens, where it seems to find conditions quite as favorable to its growth.*

Fl.—Late May to early June. *Fr.*—Late June into July.

Pine Barrens.—Hornerstown, Toms River (S), Head of Batsto (S), Speedwell, Quaker Bridge (P).

Maritime.—Sandy Hook, Long Branch, Asbury Park, Pt. Pleasant, Forked River, Seaside Park, Barnegat, Beach Haven Terrace (L), Barnegat City (L), Beach Haven (L), Atlantic City, Longport (S), Ocean City (S), Five-Mile Beach, Cape May (S), Cape May Pt. (S).

Hudsonia ericoides L. Heath-like Hudsonia, Pine Barren Heather.

Hudsonia ericoides Linnæus, Mantissa I. 74. 1767 [Virginia]—Pursh, Fl. Am. Sept. II. 364. 1814.—Nuttall, Gen. II. 4. 1818.—Knieskern 7.—Willis 10.—Britton 54.—Keller and Brown 226.

Common in white sand in the Pine Barrens, also reported from Middlesex County.

This is the "Heather" of the Pine Barrens; the characteristic species in the patches of open white sand. It resembles the preceding in manner of growth, but is greenish instead of grayish-white, lacking the dense tomentum; and its foliage is somewhat bristly, as contrasted with the softness of the other species. On the "plains," where it reaches its maximum development, I have seen it only in late June, when the season of flowering was past, but a little earlier, judging from the abundance of seed pods, the whole surface of this desolate region must have been a carpet of golden bloom.

Fl.—Late May to early June. *Fr.*—Late June into July.

Pine Barrens.—Allaire, Pt. Pleasant, Toms River, Forked River, Island Hts., Bamber, Barnegat, New Lisbon (C), Browns Mills, South of New Egypt, E. Plains (S), Clementon, Albion, Sumner, Head of Batsto (S), Iona (S), Iskip, Williamstown Jnc., Folsom, Willow Grove (NB), Mouth of

* Cf. Bartlett, *Rhodora*, Dec. 1909, 221. *In re* maritime plants away from the coast.

Batsto (S), Vineland (S), Hammonton (Bassett), Quaker Bridge, Pleasant Mills, Batsto, Mays Landing (S), Bridgeton, Atco (P), Absecon (P).

Coast Strip.—Atlantic City.

LECHEA.

Flowering and Fruiting Data.—The date under "Basal leaves" signifies the approximate time of their appearance. Along with the capsules they are more or less persistent over winter into early summer.

The flowers are small and inconspicuous, and of little or no taxonomic importance. They appear in mid or late summer. Identification can only be satisfactorily made when mature fruit is present, or better when the basal leaves also are developed.

Lechea minor L. Thyme-leaved Pinweed.

Pl. LXXXIII., Fig. 3.

Lechea minor Linnæus, Sp. Pl. 90. 1753 [Canada].

Lechea thymifolia Knieskern 8.—Willis 11.—Britton 54.

Lechea Novæ-Cæsareæ Austin, Gray's Man. Ed. V. 81. 1867 [N. New Jersey and adjacent N. Y.].

Frequent in the Pine Barrens, and occasional in outlying islands in the Middle district and in the Cape May peninsula.

Fr.—Late August to early October. *Basal leaves*.—About mid-October.

Middle District.—Red Bank (C), Long Branch (C), Griffith's Swamp, Haddonfield.

Pine Barrens.—Cassville, Toms River, Pasadena, Chatsworth, Atco (C), Penbryn (S), Folsom, Quaker Bridge (S), White Horse (P).

Cape May.—Court House (S).

Lechea racemulosa Michx. Oblong-fruited Pinweed.

Pl. LXXXIII., Fig. 2.

Lechea racemulosa Michaux, Fl. Bor. Am. I. 77. 1803 [Virginia].—Pursh, Fl. Am. Sept. I. 91. 1814.—Britton 54.

Common in dry sandy ground of the Pine Barrens and Cape May peninsula, and occasional in the North and Middle districts.

Fr.—Early August to mid-September. *Basal leaves*.—About late September.

Middle District.—Oaklyn (S), Orchard (S), Bridgeton (NB).

Pine Barrens.—Forked River (NB), Fort Barnegat, Speedwell (S), Parkdale (S), Penbryn (S), Palermo (S), Tuckahoe (S).

Cape May.—Dennisville (S), Cold Spring.

***Lechea villosa* Ell. Large Hairy Pinweed.**

Pl. LXXXIII., Fig. 1.

Lechea villosa Elliot Bot. S. Car. and Ga. I. 184. 1817 [S. Carolina].*Lechea major* Barton, Fl. Phila. I. 75. 1818.—Knieskern 7.*Lechea minor* Britton 54.

Dry soil; frequent throughout the State.

Fr.—Late July to early September. *Basal leaves.*—About mid-September.*Middle District.*—Keyport (NB), New Egypt, Medford (S), Orchard (S), Lindenwold (S), Westville, Mickleton.*Pine Barrens.*—Bamber, Manahawkin, Speedwell (S), Atco, Malaga (S), Penbryn (S), Clementon, Landisville, Dennisville (S).*Cape May.*—Seaville, Court House (S), Cape May Pt., Bennett.***Lechea maritima* Leggett. Beach Pinweed.**

Pl. XXXIII., Fig. 4.

Lechea maritima Leggett, Britton Prelim. Cat. N. J. Plants 13. 1881. n. n. for *L. thymifolia* Pursh (nec Michaux). [Virginia].—Britton 54.—Keller and Brown 226.Common on sandy dunes, etc., along the coast and occasional in the Pine Barrens. The inland plant may prove to be *L. m. interior* Robinson (Rhodora, 1908, 34), but it does not seem to differ from the coast form.*Fr.*—Early September to early October. *Basal leaves.*—About late September.*Pine Barrens.*—Barnegat, Winslow Inc. (S), Hammonton, Quaker Bridge (C), Egg Harbor City (S).*Maritime.*—Sandy Hook, N. Spring Lake (NB), Seaside Park, Spray Beach (L), Barnegat City (L), Atlantic City, Longport (S), Ocean City, Holly Beach, Wildwood, Cape May, Cape May Pt.***Lechea tenuifolia* Michx. Narrow-leaved Pinweed.***Lechea tenuifolia* Michaux, Fl. Bor. Am. I. 77. 1803 [near Santee, S. C.].—Britton 55.—Keller and Brown 226.

But one record: "Phalanx Monmouth Co.—Leggett." (Britton's Catalogue.)

Lechea leggettii* Britt. and Holl. Leggett's Pinweed.

Pl. LXXXIII., Fig. 5.

Lechea Leggettii Britton and Hollick, Prelim. Cat. N. Y. Plants 6. 1888 n. n. for *Lechea minor* Lam. (nec L.) [Canada].—Britton 54.*Lechea minor* Knieskern 8.

* I am in doubt as to the identity of *L. Leggettii* var. *pulchella*, Britton's Catalogue 55.

Common in dry soil in the northern counties and occasional southward, especially along the Coast strip.

Fr.—Late July to mid-September. *Basal leaves.*—About mid-September.

Middle District.—Medford, Dividing Creek.

Pine Barrens.—Atsion, Egg Harbor City.

Coast Strip.—Manahawkin, Anglesea, Wildwood.

Cape May.—Cape May (OHB).

Family VIOLACEÆ. Violets.

VIOLA L.*

Key to the Species.

- a. Plants stemless, leaves and flower scapes growing direct from a root-stalk.
 - b. Style club-shaped, beakless; orange tips of the stamens large and conspicuous in the center of the flower, leaves divided into numerous linear segments. *Viola pedata lineariloba*, p. 565
 - bb. Style dilated upward, with a conical beak on the lower side.
 - c. Flowers blue or lilac purple.
 - d. Leaves heart shaped.
 - e. Plants glabrous or essentially so.
 - f. Cleistogamous flowers on erect or ascending peduncles.
 - g. Cleistogamous flowers long and slender, petaliferous flowers usually pale blue with dark blue center. *V. cucullata*, p. 568
 - gg. Cleistogamous flowers ovoid, petaliferous flowers pale purple. *V. affinis*, p. 568
 - ff. Cleistogamous flowers on short prostrate peduncles, petaliferous flowers deep violet. *V. papilionacea*, p. 568
 - ee. Plants more or less pubescent.
 - f. Leaves palmately 5-9 lobed. *V. palmata*, p. 566
 - ff. Leaves, or some of them, hastately 3-5 lobed. *V. p. tribola*, p. 566
 - fff. Leaves all undivided.
 - g. Pubescence general. *V. p. sororia*, p. 567
 - gg. Pubescence confined to the upper surface of the leaves. *V. hirsutula*, p. 568
 - dd. Leaves not heart shaped.
 - e. Ovate oblong, pubescent, short petioled, often with short basal lobes. *V. fimbriatula*, p. 569
 - ee. Lanceolate, usually glabrous, basal lobes often dilated and incised. *V. sagittata*, p. 569
 - eee. Deltoid, glabrous, with short lobes at base, petals often emarginate. *V. emarginata*, p. 570
 - eeee. Divided into narrow lobes, essentially glabrous. *V. brittoniana*, p. 567

* Cf. Stone Proc. Acad. Nat. Sci. Phila., 1903, pp. 656-699. Violets of Philadelphia and vicinity.

cc. Flowers white.

d. Leaves lanceolate.

V. lanceolata, p. 571

dd. Leaves ovate, acute.

V. primulifolia, p. 571

ddd. Leaves heart shaped.

e. Stem not spotted.

V. pallens, p. 570

ee. Stem red spotted.

V. blanda, p. 570

bbb. Style dilated upward, beakless, flowers yellow, leaves round, cordate.

V. rotundifolia, p. 570

aa. Plants with leafy stems.

b. Style capitate, beakless, bearded at the summit, flowers yellow.

c. Plant softly pubescent, root leaves often wanting, stem leaves often over 7 cm. wide.

V. pubescens, p. 571

cc. Plant sparingly pubescent, root leaves usually 1-2, stem leaves smaller.

V. scabriuscula, p. 572

bb. Style not capitate, slender, stipules fringed-toothed.

c. Flowers white.

V. striata, p. 572

cc. Flowers pale violet.

V. conspersa, p. 572

bbb. Style much enlarged upward into a globose, hollow summit, stipules large, leaf-like, lyrate pinnatifid, flowers bluish white, tinged with yellow.

V. rafinesquii, p. 572

Flowering and Fruiting Data.—The flowering season indicated is that of petaliferous flowers. Under "fruit of cleistogenes" is given the approximate time when mature capsules are usually present.

The flowers of violets are of two kinds. The showy petaliferous blossoms appear early, and only regularly produce fruit in a few species. The small green apetalous flowers (cleistogenes) appear later, and generally produce fruit abundantly. The characters of the cleistogenes, the seeds and the capsules, are very important in the systematic study of the genus.

***Viola pedata lineariloba* DC. Bird-foot Violet.**

Pl. LXXXV.

Viola pedata var. *lineariloba* DeCandolle, Prodr. I. 291. 1824, based on Curtis Bot. Mag. pl. 89 [Virginia].—Stone, Proc. Acad. Nat. Sci. Phila., 1903, 681.

Viola pedata Barton, Fl. Phila. I. 120. 1818.—Knieskern 7.—Willis 9.—Britton 55.

Dry sandy soil; occasional through the northern counties, common in the Middle district and down the Coastal strip to Cape May; rare and apparently introduced in the Pine Barrens.

The Bird-foot Violet, so different from all the other species, with its orange cluster of stamens and large lilac purple flowers,

is one of the showiest spring flowers of West Jersey. The plants differ greatly in the length of the pedicels; in some they are so short that the flowers appear almost sessile, while in other more luxuriant examples they stand up six inches from the ground. Like most of the other blue violets it is occasionally found blooming in the autumn. The true *V. pedata*, with the two upper petals, dark purple, I have never found within our limits.

Fl.—Late April to mid-May, sporadically later. Cleistogenes wanting.

Middle District.—Famingdale, Pemberton (NB), Medford (S), Orchard (S), Haddonfield, Clementon, Washington Park, National Park, Westville, Mantua, Mickleton, Woodbury, Zion, Glassboro, Marlboro (NB), Bridgeton (S).

Pine Barrens.—Berlin, Whitings.

Coast Strip.—Pt. Pleasant, Petersburg, Ocean City Inc.

Cape May.—Court House.

***Viola palmata* L. Palmate Violet.**

Viola palmata Linnæus, Sp. Pl. 933. 1753 [Virginia].—Britton 55 (in part).

Rich woodlands of the northern counties and less common southward in the Middle district.

Fl.—Late April to mid-May. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Freehold (Willis), Medford (S).

***Viola palmata triloba* Schwein. Three-lobed Violet.**

Viola triloba Schwein, Amer. Jour. Sci. V. 57. 1822 [no locality, probably Pennsylvania].

Viola cucullata var. *palmata* Knieskern 7.—Willis 9.

Viola palmata Britton 55 (in part).

Viola palmata dilatata Stone, Proc. Acad. Nat. Sci., Phila., 1903, 676.

Common in woodlands of the northern counties and less abundant southward in the Middle and Cape May districts.

Fl.—Late April to mid-May. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Medford (S), Haddonfield (S), Collingswood (S), Bridgeton (S), Dividing Creek.

Cape May.—Bayside (OHB), East of Price's Beach (S).

***Viola palmata sororia* Willd. Blue Woodland Violet.**

Viola sororia Willdenow, Hort. Berol. pl. LXXII. 1806 [North America].

Frequent with the preceding.

These three forms show all sorts of intergrades. The extremes, with the narrowly divided leaves (*palmata*) and undivided leaves (*sororia*), are much less common in our limits than the more or less three-lobed (*triloba*).

Fl.—Late April to mid-May. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Medford (S).

Cape May.—Cape May.

***Viola brittoniana* Pollard. Britton's Violet.**

Viola Brittoniana Pollard, Bot. Gazette XXVI., p. 332. 1898 [Boston to Va. Beach].—Keller and Brown 227.—Stone, Proc. Acad. Nat. Sci. Phila. 1903, 679.

Viola atlantica Britton, Bull. Torr. Bot. Club 1897, 92.

Viola palmata Britton 55 (in part).

Frequent along the Coast strip and occasional in the Middle district.

This very distinct form of the cut-leaved group was first recognized by Dr. N. L. Britton, Director of the New York Botanic Garden, formerly botanist to the New Jersey Geological Survey, and author of the Catalogue of New Jersey Plants, 1888. To Dr. Britton's example and encouragement, and to the influence of his Illustrated Flora and Manual are mainly due the development of the "new school" of botanists in North America and the great advance in our knowledge of the flora of the Middle States, where he has been for many years a leader both in the field and the herbarium.

Fl.—Late April to early June. *Fr.*—Of cleistogenes, late July to late August (approx.).

Middle District.—Farmingdale, Arney's Mt. (S), Lawnside (S), Orchard (S), Mickleton, Swedesboro, Salem (NB).

Coast Strip.—Sea Bright (NB), Bay Head, Manahawkin, Cox's, Tuckerton, West Creek, Somers Point, Absecon (Bassett), Ocean City Inc., Tuckahoe (S), Cold Spring (S), Cape May.

***Viola pectinata* Bicknell. Pectinate Violet.**

Viola pectinata Bicknell, Torrey IV. 129. 1904 [Woodmere, L. I.].

This curious triangular-leafed violet is usually associated with *V. brittoniana*, of which it seems to be an entire leafed form. Discovered in our region by Mr. Bayard Long.

Cape May.—Bennett.

***Viola affinis* LeC. Thin-leaved Wood Violet.**

Viola affinis LeConte, Ann. Lyc. N. Y. II. 138. [no locality]—Stone, Proc. Acad. Nat. Sci. Phila. 1903, 671.

Frequent in moist woods and edges of thickets in the North and Middle districts.

Fl.—Late April to late May. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Medford (S), Oaklyn (S), Westville, Gloucester Co., Quinton.

***Viola papilionacea* Pursh. Blue Meadow Violet.**

Viola papilionacea Pursh, Fl. Am. Sept. I. 173. 1814 [Philadelphia].—Stone, Proc. Acad. Nat. Sci. Phila. 1903, 670.

Fields and edges of woodland; common in the Northern and Middle districts.

Fl.—Mid-April to mid-May. *Fr.*—Of cleistogenes, early June to early July (approx.).

Middle District.—Kinkora, Blackwood, Collingswood, Woodbury, Medford (S), Alloway.

***Viola hirsutula* Brainerd. Southern Wood Violet.**

Viola hirsutula Brainerd, Rhodora 1907, 98. [n. n. for *V. villosa* Nutt. nec Walter.—Philadelphia].

Viola cucullata var. *cordata* Britton 56.

Viola villosa cordifolia Stone, Proc. Acad. Nat. Sci. Phila. 1903, 670.

Occasional in woods in the Northern and Middle districts.

Fl.—Late April to late May. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Kinkora, Collingswood (S).

***Viola cucullata* Ait. Blue Marsh Violet.**

Pl. LXXXIV., Fig. 1.

Viola cucullata Aiton, Hort. Kew. III. 288. 1789 [North America].—Knieskern 7.—Britton 55.

Viola cucullata macrotis and *leptostachya* Stone, Proc. Acad. Nat. Sci. Phila. 1903, 673.

Common in swamps and meadows throughout the State, except in the Pine Barrens.

Fl.—Late April to late May. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Freehold (Willis), Farmingdale, Bordentown, Delanco, Fish House (S), Delair, Medford (S), Orchard (S), Haddonfield, Collingswood, Blackwood, Woodbury, Westville, Washington Park, Glassboro, Bridgeton.

Coast Strip.—Palermo (S), Cold Spring (OHB).

***Viola sagittata* Ait. Arrow-leaved Violet.**

PL. LXXXVII.

Viola sagittata Aiton, Hort. Ken. III. 287. 1789 [Pennsylvania].—Barton, Fl. Phila. I. 120. 1818.—Knieskern 7.—Britton 56.

Frequent in fields and on banks in the Northern and Middle districts and occasional on the Coast Strip. Rare along railroads in the Pine Barrens.

Fl.—Late April to mid-May. *Fr.*—Of cleistogenes, late June to late August (approx.),

Middle District.—Shark River, Fish House, Locust Grove (S), Orchard (S), Oaklyn, Woodbury, Yorktown, Riddleton, Alloway.

Pine Barrens.—Whitings (S).

Coast Strip.—Pt. Pleasant, Palermo.

***Viola fimbriatula* J. E. Smith. Ovate-leaved Violet.**

PL. LXXXVI.

Viola fimbriatula J. E. Smith, Rees Cyclopædia XXXVIII. 1817 [Canada to Virginia].

Viola ovata Barton, Fl. Phila. I. 121. 1818.—Willis 9.

Viola sagittata var. *ovata* Britton 56.

Frequent in dry soil throughout the Coastal plain, except in the Pine Barrens, where it occurs mainly along railroads and is not common.

Fl.—Late April to mid-May. *Fr.*—Of cleistogenes, late June to late August (approx.).

Middle District.—Haddonfield (S), Westville, W. Deptford, Collingswood (S), Swedesboro.

Pine Barrens. Whitings (S), New Germany (T).

Coast Strip.—Asbury Park, Pt. Pleasant, Barnegat City Inc. (L), Palermo, Mays Landing (NB).

Cape May.—Court House (S).

***Viola emarginata* (Nutt.). Triangle-leaved Violet.**

Viola sagittata emarginata Nuttall, Gen. I. 147. 1818 [New Jersey, near Philadelphia].—Barton, Fl. Phila. I. 120. 1818.—Stone, Proc. Acad. Nat. Sci. Phila. 1903, 684.

Occasional or locally common through the Middle, Coast and Cape May districts; rare in the Pine Barrens along railroads.

Fl.—Late April to mid-May. *Fr.*—Of cleistogenes, late June to late August (approx.).

Middle District.—Medford (S), Orchard (S), Tuckahoe.

Pine Barrens.—Folsom.

Coast Strip.—Bayhead.

Cape May.—Court House, Cape May (OHB).

***Viola rotundifolia* Michx. Round-leaved Violet.**

Viola rotundifolia Michaux, Fl. Bor. Am. II. 150. 1803 [High Mountains of Carolina].—Britton 56.—Keller and Brown 228.

Frequent or occasional in rich woods of the Northern Counties; very rare southward within our limits in the upper Middle district.

Fl.—Early April to late April. *Fr.*—Of cleistogenes, late June to late August (apparently).

Middle District.—Keyport (C), Kinkora.

***Viola blanda* Willd. Red-stemmed White Violet.**

Viola blanda Willdenow, Hort. Berol. pl. XXIV. 1806 [North America].

Rich woods of the northern counties, rare southward, just entering our limits.

Fl.—Immature cleistogenes May 28–30, 1910.

Middle District.—Farmingdale.

Viola pallens* (Banks). Sweet White Violet.*Pl. LXXXIX.**

Viola rotundifolia pallens "Banks" DeCandolle, Prodr. I. 295 [Labrador].

Viola blanda Barton, Fl. Phila. I. 122. 1818.—Knieskern 7.—Britton 56.

In swampy ground; rather common in the northern counties, becoming much less plentiful southward in the Middle district.

Fl.—Late April to late May. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Bordentown, Riverton (Bassett), Merchantville, Sewell, Woodbury, Clementon.

***Viola primulifolia* L. Primrose-leaved Violet.**

Pl. LXXXVIII., Fig. 1.

Viola primulifolia Linnæus, Sp. Pl. 934 [Virginia].—Barton, Fl. Phila. I. 123. 1818.—Knieskern 7.—Willis 8.—Britton 56.—Stone, Proc. Acad. Nat. Sci. Phila. 1903, 668.

Plentiful in swamps throughout the Middle and Coast districts, following the Coastal plain north of our limits, also occasional in the Pine Barrens.

Fl.—Late April to early June. *Fr.*—Of cleistogenes, mid-August to mid-October (approx.).

Middle District.—Farmingdale, Bordentown, Kinkora, Delanco, New Egypt, Browns Mills, Medford, Oaklyn, W. Deptford, Oaklyn (S), Westville, Woodbury, Collingswood, Glassboro, Mickleton, Yorktown, Alloway.

Pine Barrens.—Landisville (T), Pleasant Mills, Egg Harbor (S), Tuckahoe.

Coast Strip.—Seabright (NB), Pt. Pleasant, Bayhead, Palermo.

***Viola lanceolata* L. Lance-leaved Violet.**

Pl. LXXXVIII., Fig. 2.

Viola lanceolata Linnæus, Sp. Pl. 934. 1753 [Canada].—Barton, Fl. Phila. I. 123. 1818.—Knieskern 7.—Britton 56.—Stone, Proc. Acad. Nat. Sci. Phila. 1903, 669.

Plentiful in swamps and bogs throughout our region and northward on the Coastal plain and along the Delaware River.

This is the most widely distributed of the White Violets in our region, and the most abundant violet of any kind in the Pine Barrens. It is apparently the only one that is truly indigenous there, all the others being intrusions from the Middle district.

Fl.—Late April to early June. *Fr.*—Of cleistogenes, early September to early October (approx.).

Middle District.—New Egypt, Delanco, Medford, Orchard (S), Haddonfield, Locust Grove, Haddonfield, Glassboro, Center Sq., Bridgeton (S).

Pine Barrens.—Toms River, Forked River, Bear Swamp (S), Head of Batsto, Atco, White Horse, Head of Batsto, Clementon (S), Landisville (T), Pleasant Mills (T), Egg Harbor River, Mays Landing (NB), Bellevue (T).

Coast Strip.—Bayhead, Spray Beach (L), Surf City (L), Barnegat City (L), Sherburn's (L).

Cape May.—South Dennis.

***Viola pubescens* Ait. Hairy Yellow Violet.**

Viola pubescens Aiton, Hort. Ken. III. 290. 1789 [N. America].—Knieskern 7.—Willis 10.—Britton 57.

Frequent in woods of the northern counties, but very rare within our limits, being reported definitely only from Cream Ridge, Monmouth County (Willis), while Knieskern states that it occurs in the same county.

Fl.—[In Pennsylvania] Late April to mid-May. *Fr.*—Of cleistogenes, early July to early August (approx.).

Viola scabriuscula* (T. & G.). Smooth Yellow Violet.

Viola pubescens var. *scabriuscula* Torrey and Gray, Fla. N. A. I. 142. 1838 [Pennsylvania and Kentucky].—Britton 57.

Frequent in woods of the northern counties; rarely south in the Middle district.

Fl.—Mid-April to early May. *Fr.*—Of cleistogenes, late June to late July (approx.).

Middle District.—New Egypt, Kinkora, Swedesboro.

***Viola conspersa* Reich. American Dog Violet.**

Viola conspersa Reichenbach Iconographia Botanica I. 44. 1823 [New York].

Viola canina Willis 10.

Viola canina var. *Muhlenbergii* Britton 57.

Frequent in woods of the northern counties; rare and local southward in the Middle district and in the lower Cape May peninsula.

Fl.—Late April to late May.. *Fr.*—Of cleistogenes, mid-June to mid-July (approx.).

Middle District.—Freehold (C), Pemberton Jnc. (C), Lindenwold, Mullica Hill (NB), Swedesboro, Marlboro (NB).

Cape May.—Cold Spring (OHB).

***Viola rafinesquii* Greene. Field Pansy.**

Viola rafinesquii Greene, Pittonia IV. 9. 1899. n. n. for *V. tenella* Raf., Amer. Mo. Mag. IV. 191. 1810=*V. arvensis* Nutt. [Vicinity of Phila., prob. N. J.]

Viola bicolor Barton, Fl. Phila. I. 124. 1818.

Viola tenella Muhlenberg Cat. 26. 1813.—Britton 58.

Frequent in dry sandy situations throughout the Middle district and northward on rocks along the Delaware River.

*I am convinced that the record of *V. striata*, from our region, is based on an escape from cultivation.

Named in honor of C. S. Rafinesque (1783-1840), an eccentric naturalist, but to some extent fulfilling his own estimate that in matters of classification and nomenclature he was far in advance of the men of his time. Rafinesque was thoroughly acquainted with the flora of the Pines and discovered not a few new species among the swamps and bogs of this region.*

Fl.—Mid-April to mid-May.

Middle District.—New Egypt (NB), Crosswicks, Pensauken (S), Moorestown (NB), Medford, Locust Grove, Camden, Fancy Hill, Westville, Red Bank, Woodbury, Bridgeport, Mantua, Sewell, Bridgeton, Vineland (C).

Cape May.—Cape May Co. (C).

Order OPUNTIALES.

Family CACTACEÆ. Cacti.

OPUNTIA Miller.

***Opuntia opuntia* (L.). Prickly Pear.**

Pl. XXIX., Fig. 1.

Cactus Opuntia Linnæus, Sp. Pl. 468. 1753 [Pennsylvania and Virginia].—

Pursh, Fl. Am. Sept. I. 327. 1814.—Nuttall, Gen. I. 296. 1818.

Opuntia vulgaris Knieskern 15.—Britton 111.—Martindale, Bull. Tor. Bot. Club VI. 105.

Opuntia rafinesquii Willis 25.—Martindale, Bull. Tor. Bot. Club VI. 116.

Opuntia opuntia Britton 229.

Rocky situations in Bergen, Passaic, Morris and Hunterdon Counties, and frequent in sand in the Middle and Coast districts. Only known from the Pine Barrens close to the edge of the Middle district.

Fl.—Early June to early July.

Middle District.—Matawan (Willis), New Egypt, Pemberton (NB), Medford (S), Clementon (S), Swedesboro, Willow Grove (T), Vineland (S).

Coast Strip.—Sandy Hook, Pt. Pleasant (Kn), Toms River (Kn), Seaside Park (S), Barnegat City (L), Tucker's (L), Beach Haven (L), Atlantic City, Wildwood (UP).

* Cf. Life and Writings of Rafinesque. R. E. Call. Louisville 1895.

Order THYMELEALES.

Family THYMELEACEÆ. Mezereon, etc.

DIRCA L.

Dirca palustris L. Leatherwood.

Dirca palustris Linnæus, Sp. Pl. 358. 1753 [Virginia].—Britton 213.—Keller and Brown 230.

Occasional in rich woods of the northern counties and at one station within our limits.

Fl.—Early or mid-April, probably; before the leaves.

Middle District.—Two miles west Woodstown, Swedesboro (CDL), Salem (H).

Order MYRTALES.

Family LYTHRACEÆ. Loosestrife, etc.

Key to the Species.

- a. Calyx tube campanulate, flowers regular.
 - b. Flowers small axillary, low aquatic herbs.
 - c. Capsule bursting irregularly. [*Ammania koehnei*]¹
 - cc. Capsule splitting longitudinally. *Rotala ramosior*, p. 574
 - bb. Flowers large, purple, in axillary cymes, forming whorls, plant an aquatic shrub. *Decodon verticillatus*, p. 575
- aa. Calyx tube cylindrical, flowers regular, purple.
 - b. Flowers axillary, solitary.
 - c. Leaves mostly alternate, flowers 6–10 mm. broad. *Lythrum alatum*, p. 576
 - cc. Leaves mostly opposite, flowers 3 mm. broad. *Lythrum lineare*, p. 575
 - bb. Flowers in paniced terminal spikes 12–16 mm. broad. [*L. salicaria* L.]²
- aaa. Calyx tube tubular, flowers irregular, purple, plant viscid. *Parsonia petiolata*, p. 576

ROOTALA L.

Rotala ramosior (L.). *Rotala*.

Ammania ramosior Linnæus, Sp. Pl. 120. 1753 [Virginia].—Britton 107.

Ammania humilis Barton, Fl. Phila. I. 91. 1818.—Willis 24.

Rotala ramosior Keller and Brown 230.

¹ Occurs on the Hackensack Marshes.

² Purple Loosestrife, wet meadows and swamps locally introduced.

Swamps in the western part of the Middle district to the Cape May peninsula and the lower Coast district and southwestern edge of the Pine Barrens. Also at Closter, Bergen County.

Fl.—Early July into September. *Fr.*—Late July through autumn.

Middle District.—Burlington (C), Florence, Delanco, Camden (P), Gloucester Pt., Mickleton, Sharpstown.

Pine Barrens.—Woodbine, Belleplain (S).

Coast Strip.—Palermo.

Cape May.—Anglesea Inc., Bennett.

DECODON J. F. Gmelin.

Decodon verticillatus (L.). Swamp Loosestrife.

Pl. CVIII., Fig. 1.

Lythrum verticillatum Linnæus, Sp. Pl. 446. 1753 [Virginia].—Barton, Fl. Phila. I. 223. 1818.

Nesaea verticillata Knieskern 14.—Britton 108.

Decodon verticillatus Keller and Brown 230.

Swamps; common throughout the State, especially in the Pine Barrens and Cape May district.

A conspicuous plant on the edges of ponds, with long, wand-like branches and verticils of purple flowers. The base of the stems, growing in water or wet sphagnum, are often covered with a leathery or corky growth, such as is frequent in *Rhexia virginica* and *aristosa*, *Hypericum adpressum*, *Ludwigia sphacrocarpa*, etc.

Fl.—Early August to early September. *Fr.*—Early September into October.

Middle District.—New Egypt, Fish House, Camden, Swedesboro, Dividing Creek.

Pine Barrens.—Toms River (P), Parkdale (S), Cedar Brook, Clementon, Malaga (S), Landisville (T), Mouth of Batsto, Mays Landing, Tuckahoe (S).

Coast Strip.—Manahawkin, Surf City (L), Barnegat City (L), Ship Bottom (L), Absecon (Bassett), Wildwood, Dennisville.

Cape May.—Seaville (S), Dias Creek, Green Creek, Whitesboro.

LYTHRUM L.

Lythrum lineare L. Linear-leaved Loosestrife.

Lythrum lineare Linnæus, Sp. Pl. 447. 1753 [Virginia].—Willis 24.—Britton 107.—Stone, Barton I. 23.

576 REPORT OF NEW JERSEY STATE MUSEUM.

Rare and local along the edge of the salt marshes, and reported from the Hackensack meadows north of our boundary.

Fl.—Early August to mid-September. *Fr.*—Mid-September, through autumn.

Maritime.—Monmouth and Ocean Counties on Salt Marsh (C), Atlantic County (T), Palermo, Cold Spring.

Lythrum alatum Pursh. Wing-angled Loosestrife.

Lythrum alatum Pursh, Fl. Am. Sept. 334. 1814 [Lower Georgia].—Britton 107.—Keller and Brown 231.

Rare and local; apparently introduced.

Fl.—Late June to early August. *Fr.*—Mid-September through autumn.

Middle District.—New Egypt.

Pine Barrens.—Williamstown Jnc.

Coast Strip.—Beach Haven (L).

Cape May.—Cape May.

PARSONSIA P. Browne.

Parsonsia petiolata (L.). Clammy Cuphea.

Lythrum petiolatum Linnæus, Sp. Pl. 446. 1763 [Virginia].

Cuphea petiolata Britton 108.

Occasional or frequent in the Northern and Middle districts, usually appearing as a weed in cultivated fields.

Fl.—Late July into October. *Fr.*—Early September through autumn.

Middle District.—New Egypt, Moorestown (NB), Gloucester (P), Cooper's Ferry, Mickleton (H), Oaklyn (S), Lawnside (S).

Family MELASTOMACEÆ. Meadow-Beauties.

Key to the Species.

- a.* Stem cylindric, very pubescent, flowers pale purple. *Rhexia mariana*, p. 578
- aa.* Stem square or angled, flowers deep purple.
 - b.* Plant more or less pubescent, leaves ovate. *R. virginica*, p. 576
 - bb.* Plant glabrous, leaves lance-oblong. *R. aristosa*, p. 577

RHEXIA L.

Rhexia virginica L. Meadow Beauty.

Rhexia virginica Linnæus, Sp. Pl. 346. 1753 [Virginia].—Barton, Fl. Phila.

I. 180. 1818.—Michaux, Fl. Bor. Am. I. 222. 1803.—Knieskern 14.—

Willis 24.—Britton 106.

Common in sandy swamps throughout the Coastal plain region and northward to Closter, Bergen County, and Stockton, Hunterdon County. Especially abundant in the Pine Barrens.

This plant seems to take the place of such late spring plants as *Limodorum*, *Arethusa*, etc., in the color scheme of the swamps and bogs of the Pine Barrens, and throughout the latter part of summer its gorgeous flowers are conspicuous, sometimes in scattered clumps or individual plants, and again massed in large patches, so that the whole surface of the bog seems crimson. There is a certain amount of variation in color, some flowers being very deep magenta, but they never approach the pale pink of *R. mariana*.

Fl.—Early July to mid-September. *Fr.*—Early August into autumn.

Middle District.—New Egypt, Medford (S), Pemberton Jnc. (S), Lindenwold, Fish House, Kaighns Pt., Washington Park, Lawnside (S), Center Square, Paulsboro, Salem (S).

Pine Barrens.—Whitings (S), Speedwell (S), Parkdale, Bear Swamp, Cedar Brook, Clementon (S), Landisville (T), Hospitality Branch (T), Egg Harbor City, Tuckahoe (S), Belleplain (S), Woodbine, Sea Isle Jnc., Dennisville (S).

Coast Strip.—Waretown, Cox's, N. Beach Haven (L), Holgate's (L), Ocean View (S), Beesley's Pt. (S), Anglesea.

Cape May.—Green Creek (S), Cape May.

***Rhexia aristosa* Britton. Awned Meadow Beauty.**

Rhexia aristosa Britton. Bull. Torr. Bot. Club XVII. 14 pl. 99. 1890 [Egg Harbor City, N. J.].—Britton 107.—Keller and Brown 231.

Rare and local; confined to the Pine Barrens.

The original specimens were discovered by Messrs. E. H. Kilmer and John C. Gifford in August, 1888, at Egg Harbor City and sent to Rev. John C. Peters, who submitted them to Dr. Britton. He at once recognized them as representatives of a new species. While the plant was collected on several subsequent occasions at the type locality, it has been found at only one other station, and that only a few miles to the east, near Cogn, where Mr. C. F. Saunders discovered it on August 21, 1898.

578 REPORT OF NEW JERSEY STATE MUSEUM.

Fl.—Late July to late August. *Fr.*—Late September into autumn.

Pine Barrens.—Egg Harbor City, Cogn.*

Rhexia mariana L. Maryland Meadow Beauty.

Rhexia mariana Linnæus, Sp. Pl. 346. 1753 [Maryland].—Barton, Fl. Phila. I. 180. 1818.—Knieskern 14.—Willis 24.—Britton 107.—Keller and Brown 231.

Common in moist sandy ground throughout the Pine Barrens, Cape May peninsula and western part of the Middle district, occasional on the coast. Not reported in the State north of our limits.

Fl.—Early July to early September. *Fr.*—Early August into autumn.

Middle District.—New Egypt, Florence, Burlington (C), Pemberton Inc. (S), Mt. Holly, Moorestown (C), Medford (S), Haddonfield (S), Griffith's Swp. (C), Kirkwood (C), Lawnside (S), Woodbury, Lindenwold, Mickleton (H), Bridgeton (NB), Dividing Creek.

Pine Barrens.—Clementon, Albion, Atco, Braddock's Mill, Winslow (S), New Italy, Pancoast (S), Egg Harbor City, Mays Landing (NB), Tuckahoe (S).

Cape May.—Clermont, Dias Creek (S), Cold Spring (S), Cape May, Cape May Pt.

Coast Strip.—Pt. Pleasant (C), Cox's, Beesley's Pt. (S).

Family ONAGRACEÆ. Evening Primroses, etc.

Key to the Species.

- a. Calyx divisions and petals 2. *Circea lutetiana*, p. 585
- aa. Calyx divisions and petals 4.
 - b. Prostrate herbs, creeping or floating, leaves opposite, flowers axillary.
 - c. Flowers sessile, inconspicuous. *Isnardia palustris*, p. 580
 - cc. Flowers stalked, with yellow conspicuous petals. *Ludwigiantha arcuta*, p. 579
 - bb. Upright herbs.
 - c. Petals none, or small, yellowish or greenish, inconspicuous, flowers axillary.
 - d. Capsules subglobose or top shaped, leaves lanceolate, acute at both ends, 50–100 mm. long. *Ludvigia sphaerocarpa*, p. 580
 - dd. Capsules obpyramidal, several times longer than broad, leaves narrowly linear, 25–50 x 2 mm. *L. linearis*, p. 581
 - cc. Petals conspicuous, yellow.
 - d. Stamens 4.

* The records for Woodbine and Cape May in Keller and Brown prove to be *R. virginica*.

- e. Plant hirsute, capsules bristly pubescent. *L. hirtella*, p. 581
- ee. Plant glabrous or nearly so, capsules glabrous.
L. alternifolia, p. 582
- dd. Stamens 8.
 - e. Stamens equal in length, capsule cylindrical.
 - f. Tall, 3-25 dm. high, flowers 25-50 mm. broad, in a leafy bracted terminal spike. *Oenothera biennis*, p. 583
 - ff. Low or decumbent, 1-5 dm. high, flowers 12-30 mm. broad, axillary.
 - g. Leaves repand dentate, the lower pinnatifid, plant silvery appressed-pubescent. *O. humifusa*, p. 583
 - gg. Leaves oblong or oval lanceolate, serrate dentate often pinnatifid, plant glabrous or sparingly pubescent. *O. laciniata*, p. 583
 - ee. Stamens unequal in length, the alternate ones longer, capsule more or less club-shaped.
 - f. Flowers 10-25 mm. broad, plant 2-6 dm. high.
Kneiffia pumila, p. 585
 - ff. Flowers 25-50 mm. broad.
 - g. Capsule glabrous or sparingly pubescent, with glandular hairs. *K. fruticosa*, p. 585
 - gg. Capsule pubescent, with fine incurved glandless hairs. *K. linearis*, p. 584
 - ggg. Capsule pubescent, with numerous straight spreading glandless hairs.
K. longipedicellata, p. 584
- ccc. Petals pink, whitish or purple.
 - d. Fruit a long slender pod splitting lengthwise, seeds with long downy coma.
 - e. Flowers 15-30 mm. broad, purple, in showy terminal racemes. *Chamaenerion angustifolium*, p. 582
 - ee. Flowers 4-6 mm. broad, pink or white.
 - f. Leaves linear or lanceolate, entire or nearly so; stem pubescent, with straight spreading hairs.
Epilobium molle, p. 582
 - ff. Leaves lanceolate, serrate, stem somewhat canescent above with incurved hairs. *E. coloratum*, p. 583
 - dd. Fruit ovoid, hard, nut-like, 1-4 seeded, flowers 8-10 mm. broad; white or pinkish, turning reddish as they fade.
Gaura biennis, p. 585

LUDWIGIANTHA Small.

Ludwigiantha arcuata (Walt.). Creeping Ludwigia.

Ludwigiantha arcuata Walter, Fl. Car. 89. 1788 [Carolina].

Coast strip; rare and local.

Mr. Bayard Long, who discovered this interesting plant, has furnished me with the following information concerning it: "On the northern part of the New Jersey coast there are numerous fresh water ponds of appreciable dimensions, but on Long

Beach Island there are only a few small pond holes, which dry up in large part during the summer. These pond holes are the habitat of such interesting species as *Zannichellia palustris* and *Potamogeton pectinatus* in the water, while on the wet, muddy, sandy margin, or on the bottom as the water recedes, are *Limosella*, *Hypericum boreale*, *Cyperus diandrus*, *Ilysanthes anagallidia*, *Scirpus nanus*, etc.

In such a habitat grows the plant here temporarily referred to *Ludwigiantha arcuata*. It grows in extensive mats, creeping over the moist sand and mud on the margin of a pond hole at St. Albans. It appears to be a much more robust plant than the southern species and differs constantly from it in numerous characters, the most striking of which is the length of the flower peduncle, which is shorter than the leaves, instead of longer. It has not been possible, as yet, to make comparison with material from Virginia, the nearest known station, but unless this should prove intermediate between the New Jersey plant and material from farther south, the former would appear to represent a distinct species."

Fl.—July and August, probably.

Coast Strip.—St. Albans (L), (BC).

ISNARDIA L.

Isnardia palustris L. Marsh Purslane.

Isnardia palustris Linnæus, Sp. Pl. 120. 1753 [Europe and Virginia].—Barton, Fl. Phila. I. 85. 1818.

Ludwigia palustris Knieskern 14.—Britton 109.

Ditches and edges of ponds; common in the Northern, Middle and Coast districts. Very rare and probably introduced in the Pine Barrens.

Fl.—Mid-June into September. *Fr.*—Mid-July into October.

Middle District.—Farmingdale, Pemberton (NJ), New Egypt, Delanco (S), Delair, Fairton (S).

Pine Barrens.—Hammonton (T), Pleasant Mills (T).

Coast Strip.—Forked River (NB), Surf City (L), Spray Beach (L), Palermo (S), Ocean City (S), Holly Beach (UP), Cold Spring (OHB), Cape May (P).

LUDVIGIA L.

Ludvigia sphærocarpa Ell. Globe-fruited *Ludwigia*.

Ludwigia sphærocarpa Elliot, Bot. S. C. and Ga. I. 213. 1817 [Orangeburgh, S. Carolina].—Willis 24.—Britton 109.—Keller and Brown 232.

Frequent in swamps in the Pine Barrens, Cape May peninsula and southern part of the Middle district. Only reported from north of our region at Closter, Bergen County, but occurs also in lower Mercer county.

Fl.—Late July to mid-September. *Fr.*—Late August to mid-October.

Middle District.—Delanco, Center Square, Mickleton, Mannington (C), Dividing Creek.

Pine Barrens.—Parkdale, Atsion, Newtonville, Pleasant Mills (T), Egg Harbor City (KB), Mays Landing (Leeds), Woodbine.

Cape May.—Green Creek (S), Bennett.

Ludvigia hirtella Raf. Hairy Ludwigia.

Ludwigia hirtella Rafinesque, Med. Rep. (II.) 5. 358. 1808 [near Baltimore].—Willis 24.—Britton 109.—Keller and Brown 232.

Swampy ground; rare and local; Pine Barrens and lower part of the Cape May peninsula.

This plant was known to both Pickering and Nuttall from the State, though who first discovered it in New Jersey I cannot say. Parker obtained it at Atsion, Burlington County, September 26, 1867; Bassett, near Hammonton, August 9, 1879, and Gross near Landisville. On July 22, 1905, I discovered it below Cape May Court House, and subsequently it has turned up in several bogs in lower Cape May.

Its strict stem and hairy leaves give it quite a different aspect from the other species of the genus found in our region.

Fl.—Early July to late August. *Fr.*—Early August to late September.

Pine Barrens.—Atsion, "Landisville"—Main Road Sta. (T), Hammonton, Quaker Bridge (C), Batsto (C), "Burlington Co." Parker (NB).

Cape May.—Below Court House, Cold Spring, Bennett.

Ludvigia linearis Walt. Linear-leaved Ludwigia.

Ludwigia linearis Walter, Fl. Car. 89. 1788 [S. Carolina].—Willis 24.—Britton 109.—Keller and Brown 232.

Swamps of the Pine Barrens; not common.

Fl.—Early July to early September. *Fr.*—Late August to early October.

Pine Barrens.—Atsion, Hammonton, Egg Harbor City, Woodbine.*

* The Mays Landing record (KB) seems to refer to something else. There is no specimen in Mr. Lippincott's herbarium.

Ludwigia alternifolia L. Seed Box.

Ludwigia alternifolia Linnæus, Sp. Pl. 118. 1753 [Virginia].

Ludwigia alternifolia Knieskern 14.—Britton 109.

Swamps; common throughout the State.

Fl.—Early July to late August. *Fr.*—Early August to late September, and more or less persistent through autumn.

Middle District.—New Egypt, Burlington, Fish House, Delaire, Pemberton Jnc. (S), Camden, Oaklyn (S), Dividing Creek.

Coast Strip.—Long Branch, Forked River, Barnegat City (L), Surf City (L), Holgate's (L), Ocean City (S), Five-Mile Beach, Cold Spring (S).

Pine Barrens.—Landisville (T), Winslow (S), Parkdale (S), Woodbine (S).

CHAMÆNERION Adanson.**Chamænerion angustifolium (L.). Fire Weed.**

Epilobium angustifolia Linnæus, Sp. Pl. 347. 1753 [Northern Europe].—Knieskern 14.

Epilobium spicatum Britton 108.

Frequent in woods and clearings of the northern counties, and not uncommon in our region in burnt ground, apparently recently introduced as a weed along the railroad.

Fl.—Early June to early September. *Fr.*—Late June to late September.

Middle District.—N. Spring Lake (NB), New Egypt, Griffiths Swamp, Sicklerville, Camden (C), Bridgeport (H), Mickleton (H), Swedesboro.

Pine Barrens.—Forked River, Bamber, New Lisbon (C), White Horse, Inslip, Atco (C), Evansville (C), Landisville, Winslow Jnc., Hammonton, Tuckahoe (S), Woodbine (S).

Cape May.—Cold Spring (OHB).

EPILOBIUM L.**Epilobium molle Torr.* Downy Willow-herb.**

Epilobium molle Torrey, Fl. U. S. I. 393. 1824 [Schenectady, N. Y.].

Epilobium strictum Britton 109.—Keller and Brown 233.

Locally in swamps of the northern counties, once reported from within our limits at Pemberton on authority of Lighthipe (Britton's Cat.).

*The record of this species at Sea Isle City, given by Keller and Brown, proves to be *E. coloratum*, that of *E. lineare* from Cape May (*Jahn*) is almost certainly the same, though no specimens are preserved.

Epilobium coloratum Muhl. **Purple-leaved Willow-herb.**

Epilobium coloratum Muhlenberg in Willdenow, Enum. I. 411. 1809 [Pennsylvania].—Knieskern 14.—Britton 109.

Damp ground throughout the State; common.

Fl.—Late July to early September. *Fr.*—Mid-August to early October.

Middle District.—New Egypt, Delanco, Medford (S), Oaklyn (S), Lawnside (S), Salem (S), Dividing Creek.

Pine Barrens.—Whitings (S), Landisville, Quaker Bridge (S), Tuckahoe (S).

Coast Strip.—Seaside Park, Spray Beach (L), Surf City (L), Beach Haven (L), Holgate's (L), Absecon (S), Ocean City (S), Wildwood (UP).

Cape May.—Green Creek (S), Bennett (S), Cold Spring (OHB).

ÆNOTHERA L.**Ænothera biennis** (L.). **Evening Primrose.**

Ænothera biennis Linnæus, Sp. Pl. 346 [Virginia].—Knieskern 14.—Britton 109.

Dry open ground; common in the Northern, Middle and Coast districts south to Cape May. To a great extent a weed in waste and cultivated ground, and in that character occasional in the Pine Barrens.

Fl.—Late June into October. *Fr.*—Late July through autumn.

Middle District.—New Egypt, Edge of Bear Swamp, Fish House.

Coast Strip.—Sandy Hook (NB), Asbury Park, Barnegat City (L), Ship Bottom (L), Crowleytown, Absecon, Ocean City (S), Palermo (S), Piermont (S), Wildwood, Cold Spring (S).

Pine Barrens.—Landisville (introduced).

Ænothera humifusa Nutt. **Seaside Primrose.**

Ænothera humifusa Nuttall, Gen. I. 245. 1818 [near Cumberland Island, Fla.].—Britton 110.—Keller and Brown 233.

Frequent on the sand dunes and upper beaches of the southern coast.

Fl.—Early July to late September. *Fr.*—Early August to late October.

Coast Strip.—Ocean City, Anglesea, Holly Beach (T), Cape May.

Ænothera laciniata Hill. **Sinuate-leaved Primrose.**

Ænothera laciniata Hill, Veg. Syst. XII. 64. 1767 [Carolina].—Keller and Brown 233.

Ænothera sinuata Barton, Fl. Phila. I. 182. 1818.—Willis 24.—Britton 110.

Ænothera sinuata var. *minima* Nuttall, Gen. I. 182. 1818.—Britton 110.

Frequent in the Middle and Coast districts, largely a weed in cultivated ground, and as such found in the Pine Barrens. Not reported in the State north of our limits.

Fl.—Mid-May to mid-July. *Fr.*—Mid-June to mid-August.

Middle District.—New Egypt, Beverly, Pemberton Jnc. (S), Mt. Holly, Vincentown (NB), Kaighns Pt., Camden, Medford (S), Locust Grove, Glassboro, Mickleton.

Pine Barrens.—Landisville, Atco, Head of Batsto, Atsion, Hammonton (Bassett).

Coast Strip.—Spray Beach (L), Atlantic City, Wildwood, Cold Spring (OHB), Cape May, Cape May Pt.

KNEIFFIA Spach.

Kneiffia linearis (Michx.). **Narrow-leaved Sundrops.**

Oenothera linearis Michaux, Fl. Bor. Am. I. 225. 1803 [Upper Carolina].—Willis 24.

Oenothera fruticosa var. *linearis* Britton 110.

Kneiffia linearis Keller and Brown 234.

Common in dry open ground all along the Coastal strip, and less plentiful in the Middle district and Pine Barrens. This seems to be decidedly the most common Evening Primrose of our region.

Fl.—Early June to early August, sporadically later. *Fr.*—early July to early September.

Middle District.—Farmingdale, Pemberton (C), Canton (C), Mickleton (H).

Pine Barrens.—Allaire (S), Quaker Bridge (C), Landisville, Eslelville (T), Mays Landing, Mullica River (Bassett), White Horse (S), Belleplain (S), Williamstown Jnc.

Coast Strip.—Pt. Pleasant (S), Seaside Park, Deal (C), Spray Beach (L), Surf City (L), Barnegat City Jnc. (L), Manahawkin, Absecon (C), Atlantic City (C), Ocean City (C), Piermont (C), Holly Beach, Cape May (S).

Kneiffia longipedicellata Small. **Long-stemmed Sundrops.**

Kneiffia longipedicellata Small, Bull. Torr. Bot. Club XXIII. 178. 1896 [W. Virginia to N. Carolina and Florida].—Keller and Brown 234.

Apparently confined to the Middle district, and very rare. Typical specimens examined from Swedesboro, collected by Mr. Chas. D. Lippincott and others from Williamstown Jnc., the latter growing with *C. linearis*, but maintaining their peculiarities of pubescence.

Fl. and *Fr.* probably similar to *K. linearis*.

Middle District.—Swedesboro.

Pine Barrens.—Williamstown Jnc.

Kneiffia fruticosa (L.). Sundrops.

Oenothera fruticosa Linnæus, Sp. Pl. 346. 1753 [Virginia].—Knieskern 14.—Britton 110.

Common in the northern counties; rare southward in the Middle district.

Fl.—Early June to early August. *Fr.*—Maturing apparently later than in *K. linearis*.

Middle District.—New Egypt, Lindenwold (S), Swedesboro, Three miles N. W. Mickleton.

Kneiffia pumila (L.). Dwarf Sundrops.

Oenothera pumila Linnaeus, Sp. Pl. Ed. 2. 493. 1762 [North America].—Willis 24.—Britton 110.

Oenothera fruticosa var. *ambigua* Barton, Fl. Phila. I. 182. 1818.

Dry open ground; frequent in the Northern and upper Middle districts and rarely in cape May County and the Pine Barrens; apparently introduced in the latter region.

Fl.—Late May to mid-July. *Fr.*—Late June to mid-August.

Middle District.—Crosswicks, Brindletown, Medford (S), Haddonfield (S), Sicklerville, Cains Mill, Mickleton.

Pine Barrens.—Atco, Williamstown Jnc.

Cape May.—Cold Spring (S).

GAURA L.**Gaura biennis L. Gaura.**

Gaura biennis Linnæus, Sp. Pl. 347. 1753 [Virginia and Pennsylvania].—Barton, Fl. Phila. I. 183. 1818.

At a number of stations in the northern counties, mainly along the banks of the Delaware River, rarely southward as far as Camden.

Fl.—Early July into October. *Fr.*—Early September through autumn.

Middle District.—Fish House, Camden, On the Delaware River (P).

CIRCÆA L.**Circæa lutetiana L. Enchanter's Nightshade.**

Circæa lutetiana Linnæus, Sp. Pl. 9. 1753 [Europe and America].—Britton 111.

Common in woods of the northern counties and occasional southward in the Middle district.

Fl.—Mid-June to late July. *Fr.*—Late July to early September.

Middle District.—Farmingdale, New Egypt, Arney's Mt. (S), Camden Co. (CP), Mickleton (H), Swedesboro.

Family HALORAGIDACEÆ. Water-milfoils.

Key to the Species.

- a. Flowers perfect, the parts in threes, petals none, plant growing on mud or in shallow water, 2-5 dm. long.
 - b. Leaves with flowers in their axils, lanceolate, serrate; those without flowers usually pectinate. *Proserpinaca palustris*, p. 586
 - bb. Leaves all pectinate. *P. pectinata*, p. 587
- aa. Flowers monoecious or dioecious, the parts in fours; plant usually floating in water with leaves often whorled and finely divided. When growing on mud, plant very small with leaves reduced.
 - b. Flowering stems practically naked, accompanied by nearly naked, upright sterile stems, leaves, when present, filiform, undivided, growing upright in shallow water, 7-35 cm. high. *Myriophyllum tenellum*, p. 587
 - bb. Flowering stems leafy.
 - c. Flowers on the axils of unmodified foliage leaves.
 - Carpels smooth and plump. *M. humile*, p. 588
 - dd. Carpels with prominent, irregular dorsal ridges. *M. pinnatum*, p. 588
 - cc. Flowers in terminal naked spikes or in the axils of greatly reduced and modified leaves.
 - d. Leaves in definite whorls, carpels papillose, roughened. *M. heterophyllum*, p. 588
 - dd. Leaves variously arranged on the same plant, carpels with irregular dorsal ridges. *M. pinnatum*, p. 588

PROSERPINACA L.

Proserpinaca palustris L. Mermaid-weed.

Proserpinaca palustris Linnæus, Sp. Pl. 88. 1753 [Virginia].—Barton, Fl. Phila. I. 76. 1818.—Britton 105.—Keller and Brown 234.

Occasional in swamps in the northern counties; locally in the Middle district and common along the Coastal strip to Cape May.

Mr. K. K. Mackenzie has described as *P. intermedia* (Torrey 1910, p. 250) a plant from half way between Barnegat Pier and Island Heights Jnc., which has the emerged fruiting leaves pectinate with a broad marginal rachis. *P. palustris* regularly puts forth shoots with this sort of leaves late in the season or where the water in which it grows becomes dried up, and I am by no means convinced that this is not a form of this species, in which

such branches are fertile. I am indebted to Mr. Mackenzie for specimens from the type collection. Mr. Bayard Long has collected the same thing at Bennett, Cape May Co., August 13th, 1911.

Fl.—Mid-June into September. *Fr.*—Mid-July into October.

Middle District.—Pine Cottage, Delanco (S), Medford (S), Swedesboro, Dividing Creek.

Coast Strip.—Long Branch, Barnegat City (L), Brant Beach (L), Surf City (L), Holgate's (L), Mays Landing, Ocean View (S), Piermont (S), Avalon, Anglesea, Cape May Ct. House (S), Cold Spring (S), Cape May Pt.

***Proserpinaca pectinata* Lam. Cut-leaved Mermaid-weed.**

Proserpinaca pectinata Lamarck, Tabl. Encycl., pl. 50, f. 1, l. 214. 1791 [North America].—Pursh, Fl. Am. Sept. I. 92. 1814.—Barton, Fl. Phila. I. 76. 1818.—Knieskern 14.—Willis 23.—Britton 105.—Keller and Brown 234.

Common in swamps of the Pine Barrens and Cape May peninsula, rare and local in the outlying islands in West Jersey.

Fl.—Mid-June into September. *Fr.*—Mid-July into October.

Middle District.—Swedesboro.

Pine Barrens.—Shark River, Forked River, Tuckerton, Manchester (Kn), Speedwell, Bear Swamp, Berlin (C), Atsion, Parkdale (S), Quaker Bridge (NB), Hammonton, Egg Harbor City, Mays Landing.

Cape May.—Cold Spring (S), Bennett.

MYRIOPHYLLUM L.

***Myriophyllum tenellum* Bigel. Slender Water Milfoil.**

Myriophyllum tenellum Bigelow, Fl. Bost. Ed. 2. 346. 1824 [Fresh Pond and Tewksbury, Mass.].—Britton 106.—Keller and Brown 235.

In shallow ponds along the upper Coast and on the Delaware River shore, rare and local.

Apparently first discovered in the State by Prof. E. H. Day in a shallow pond near the coast at Pt. Pleasant, July 17, 1882.

Fl.—Early July into September. *Fr.*—Early August into October. Flowers and fruits rare and dates somewhat conjectural.

Middle District.—Fish House.

Coast Strip.—Pt. Pleasant, Spring Lake (KB).

Myriophyllum humile (Raf.). Low Water Milfoil.

Burshia humilis Rafinesque, Med. Rep. (II.) 5. 357. 1808 [New Jersey].

Myriophyllum ambiguum Nuttall, Gen. II. 212. 1818.—Barton, Fl. Phila. II. 164. 1818.—Knieskern 14.—Willis 23.

Myriophyllum ambiguum var. *limosum* Nuttall, Gen. II. 212. 1818.

Ponds of the Pine Barrens, Middle and Coast districts, frequent.

Most of the records of *Myriophyllum heterophyllum* and *verticillatum* for our region appear to belong here. The species presents a great diversity of form, small plants creeping in mud are form *humile*, those entirely submerged in deep water are *capillacea*, and those with an emersed spike *natans*.

Rafinesque proposed a new genus for the terrestrial form, naming it in honor of Frederick Pursh, the first botanist to publish his researches upon the New Jersey Pine Barrens. Unfortunately a typographical error in Rafinesque's paper makes the genus "*Burshia*" in honor of "Mr. Bursh."

Fl.—Early June into October. *Fr.*—Late June through autumn.

Middle District.—Keyport (C), Freehold (C), Pemberton (NB), Camden, Gloucester (NB), Clementon, Riddleton, Millville.

Pine Barrens.—Jackson, Taunton, Landisville, Pancoast, Egg Harbor City (P).

Coast Strip.—Deal (KB), Toms River (McK), Manahawkin, Wildwood (H).

Myriophyllum pinnatum (Walt.). Pinnate Water Milfoil.

Potamogeton pinnatum Walter, Fl. Car. 90. 1788 [South Carolina].

Myriophyllum scabratum Willis 23.

Myriophyllum pinnatum Britton 105.—Keller and Brown 235.

Ponds of the Middle and Coast districts south to Cape May, frequent; apparently not in the Pine Barrens.

Fl.—Early June into autumn. *Fr.*—Late June into autumn.

Middle District.—Freehold (C), Washington Park (S), Westville (KB), Taunton (S), Swedesboro, Riddleton.

Coast Strip.—Wildwood, Anglesea, Cape May (NB and P), Cape May Pt.

Myriophyllum heterophyllum Michaux. Various-leaved Water Milfoil.

Myriophyllum heterophyllum Michaux, Flor. Bor. Am. II. 191 [Carolina and Georgia].—Britton 106.—Keller and Brown 235.

Very rare within our limits. Collected by F. L. Bassett in 1882 at Hammonton.

Pine Barrens.—Hammonton.

Order UMBELLALES.

Family ARALIACEÆ. Ginsengs.

Key to the Species.

- a. Leaves alternate, decomposed; styles 5.
 - b. Umbels numerous, in a large panicle, leaves large, decomposed.
 - c. A spiny shrub or tree, leaflets thick, ovate. *Aralia spinosa*, p. 589
 - cc. A large, branching, unarmed herb, leaflets thin, cordate.
 - A. racemosa*, p. 589
 - bb. Umbels 2-7, stem short, somewhat woody, leaves bipinnate.
 - c. Plant prickly, with a leafy stem. *A. hispida*, p. 590
 - cc. Plant unarmed, leaves and peduncle arising independently from the root-stalk. *A. nudicaulis*, p. 589
- aa. Leaves verticillate, styles 2 or 3.
 - A low herb, 7-20 cm. high, leaves with 3-5 palmately arranged leaflets. *Panax trifolium*, p. 590

ARALIA L.

Aralia racemosa L. Wild Spikenard.

Aralia racemosa Linnæus, Sp. Pl. 273. 1753 [Canada].—Barton, Fl. Phila. I. 156. 1818.—Britton 119.

Frequent in woods of the northern counties, rare southward in the Middle district within our limits.

Fl.—Early July to late August. *Fr.*—Early September into October.

Middle District.—Holmdel (C), Blackwood, Mt. Ephraim (P).

Aralia nudicaulis L. Wild Sarsaparilla.

Aralia nudicaulis Linnæus, Sp. Pl. 274. 1753 [Virginia].—Knieskern 16.—Willis 27.—Britton 119.

Frequent in woods of the Northern, Middle and Coast districts; rather rare in the Pine Barrens.

Fl.—Early May to late May. *Fr.*—Late June to mid-July (approx.).

Middle District.—Shark River, New Egypt, Bordentown, Kinkora, Sickler-ville, Glassboro, Bridgeton (S).

Pine Barrens.—Davenport, Albion, Landisville, Tabernacle, Waterford (P).

Coast Strip.—Pt. Pleasant (S), Forked River, Cox's Barnegat, Surf City (L), Manahawkin, Holly Beach (UP).

Aralia spinosa L. Hercules Club.

Aralia spinosa Linnæus, Sp. Pl. 273. 1753 [Virginia].—Britton 119.—Keller and Brown 236.

Very rare, Middle and Pine Barren districts; possibly in part introduced, but certainly native in Delaware.

Middle District.—Keyport (C), Mantua (H), probably an escape.

Pine Barrens.—Swamp at Ancora, July 28, C. F. Parker (P).

***Aralia hispida* Vent. Bristly Sarsaparilla.**

Aralia hispida Ventenot, Hort. Cels. pl. 41. 1800 [Quebec].—Knieskern 16.—Willis 27.—Britton 119.—Keller and Brown 236.

Open sandy soil of the northern counties occasional or locally common; very rare southward within our limits, in the upper Coast district, according to Knieskern. Mr. C. S. Williamson assures me that it occurred at Asbury Park, though the locality is now destroyed.

Coast Strip.—Monmouth and Ocean Counties (C), Asbury Park (KB).

PANAX L.

***Panax trifolium* L. Dwarf Ginseng.**

Panax trifolium Linnæus, Sp. Pl. 1059, 1753 [Virginia].

Aralia trifolia Willis 27.—Britton 119.

Frequent in woods of the northern counties, rare or local southward in the Middle district.

Fl.—Late April to mid-May. *Fr.*—Mid-May to early June.

Middle District.—Freehold (C), Farmingdale, Pemberton (C), Medford (S), Timber Creek (P), Haddonfield, Mantua, Mickleton (H), Swedesboro, Marlboro (NB).

Family UMBELLIFERÆ. Carrots, etc.

Key to the Species.

- a. Leaves simple, undivided or slightly lobed.
 - b. Leaves narrow, mostly spiny toothed, flowers in dense heads.
 - c. Parallel veined. *Eryngium yuccifolium*, p. 594
 - cc. Reticulate veined. *E. aquaticum*, p. 594
 - bb. Leaves orbicular or ovate, slender petioled, often peltate.
 - c. Leaves nearly orbicular, peltate.
 - d. Pedicels slender. *Hydrocotyle umbellata*, p. 592
 - dd. Some of the pedicels very short.
 - c. Fruit notched at each end. *H. canbyi*, p. 592
 - cc. Fruit not notched. *H. verticillata*, p. 593
 - cc. Leaves nearly orbicular, cordate or reniform, not peltate.
 - H. americana*, p. 593
 - aa. Leaves reduced to hollow jointed petioles or phyllodes, 2-8 cm. tall.
 - Lilaeopsis lineata*, p. 598
- aaa. Leaves, or some of them, pinnate, ternate, digitate, decompound, or deeply lobed.

- b. Flowers in simple umbels, leaves pedately lobed. *Hydrocotyle*, p. 592
- bb. Flowers in dense heads, leaves spiny toothed. *Eryngium*, p. 594
- bbb. Flowers in compound umbels.
- c. Flowers white, pink or greenish.
- d. Fruit bristly or hairy.
- e. Leaves digitately, 3-7 parted or lobed.
- f. Styles much exceeding the bristles of the fruit, recurved.
- g. Fruit 6-7 mm. long, sessile, flowers greenish white.
Sanicula marilandica, p. 593
- gg. Fruit 3-4 mm. long, slightly pedicelled, flowers yellow. *S. gregaria*, p. 594
- ff. Styles shorter than the bristles. *S. canadensis*, p. 593
- ee. Leaves pinnately or ternately decompound or dissected.
- f. Fruit linear, tapering to the base, ribbed.
- g. Stem villose pubescent, style 1 mm. long.
Washingtonia claytoni, p. 595
- gg. Stem glabrous except at the nodes, style 2 mm. long. *Washingtonia longistylis*, p. 595
- ff. Fruit ovid, bristly. [*Daucus carota*]¹
- dd. Fruit smooth, ribbed or winged (rarely somewhat pubescent).
- e. Fruit flattened dorsally (*i. e.*, the two carpels separated by the long axis of the fruit).
- f. Leaves simply ternate or pinnate. *Oxypolis*, p. 600
- ff. Leaves ternately or pinnately compound.
- g. Segments oval, plant 6-12 dm. high.
Angelica villosa, p. 599
- gg. Segments large cordate, plant 1-3 m. high.
Heracleum lanatum, p. 601
- ee. Fruit flattened laterally (carpels separated by the short axis of the fruit).
- f. Fruit linear.
- g. Leaves 3-foliate. *Deringa*, p. 597
- gg. Leaves decompound, finely dissected.
Charophyllum, p. 595
- ff. Fruit ovate or ovoid.
- g. Leaves once pinnate. *Sium*, p. 597
- gg. Leaves pinnately compound.
- h. Leaf segments lanceolate, plant 9-18 dm. high. *Cicuta maculata*, p. 596
- hh. Leaf segments narrowly linear, bulblets in the axils of the upper leaves, plant 3-10 dm. high. *C. bulbifera*, p. 596
- ggg. Leaves finely divided into filiform segments.
Ptilimnium, p. 598
- cc. Flowers yellow.
- d. Fruit dorsally flattened. [*Pastinaca sativa*]²

¹ Wild Carrot. An abundant weed in fields, etc.

² Wild Parsnip. A weed in damp meadows, etc.

- dd. Fruit not flattened. Leaves mostly biternate, segments incised or lobed, rather thin. *Thaspium barbinode*, p. 599
- ddd. Fruit laterally flattened.
- e. Leaf segments oval or ovate, entire. *Taenidia integerrima*, p. 597
- ee. Leaf segments crenate, lobed or incised.
- f. Basal leaves 2-3 ternately compound. *Zizia aurea*, p. 595
- ff. Basal leaves cordate, undivided. *Z. cordata*, p. 596
- ccc. Flowers purple. *Thaspium trifoliatum*, p. 599

HYDROCOTYLE L.

Hydrocotyle umbellata L. Umbellate Marsh Pennywort.

Pl. XC., Fig. 2.

Hydrocotyle umbellata Linnæus, Sp. Pl. 234. 1753 [Virginia].—Willis 25.—Britton 112.

Common in swampy ground in the Middle, Coast and Cape May districts, especially the last.

In the Cape May peninsula the prevalent form has proliferous umbels, but in all other respects appears to be typical *umbellata*.

Fl.—Late June into September. *Fr.*—Early August through autumn.

Middle District.—Red Bank (C), Pt. Pleasant (C), Burlington, Charleston (NB and P), Lindenwold (S), Kaighns Pt., Sewell (S), Pennsgrove, Swedesboro, Beaver Dam.

Coast Strip.—Forked River, Pt. Pleasant, Absecon (S), Atlantic City, Palermo (S), Piermont (S), Anglesea, Holly Beach (T), Bennett (S), Cold Spring (S), Court House (S), Cape May, Dennisville.

Hydrocotyle canbyi C. & R. Canby's Marsh Pennywort.

Hydrocotyle canbyi Coulter and Rose, Bot. Gazette XII. 103. 1887. n. n. for *H. umbellata* var. *ambigua* Gray Man. Ed. 5. 190. 1867 (nec Pursh) [New Jersey to Maryland].

Hydrocotyle umbellata var. *ambigua* Willis 25.

Hydrocotyle ambigua Britton 113.

Rare in wet ground of the Cape May district.

The late Chas. F. Parker apparently first collected it in the State, and August 13th, 1911, Mr. Bayard Long found it at Cape May Court House, on the edge of the salt marsh. The specimens recorded by Dr. Britton from Cumberland County, collected by

Mr. Commons, I have examined carefully and feel confident that they are merely stunted *H. umbellata*.

Cape May.—Court House, Cape May (P).

***Hydrocotyle verticillata* Thunb. Whorled Marsh Pennywort.**

Hydrocotyle verticillata Thunberg, Diss. II. 415 pl. 3. 1798 [no locality].—

Britton 113.—Keller and Brown 238.

Hydrocotyle interrupta Willis 25.

Moist ground, Coast district, not common, extending around to the Bay shore of Cape May County.

Flowers, good fruit and buds July 24, 1894—Wildwood.

Coast Strip.—Red Bank (NB), Deal (KB), Atlantic City, Wildwood, Cape May (C), New England (OHB).

***Hydrocotyle americana* L. American Marsh Pennywort.**

Hydrocotyle americana Linnæus, Sp. Pl. 234. 1753 [North America].—

Knieskern 15.—Willis 25.—Britton 112.

Moist shaded places in the northern counties, south locally in the Middle district.

Fl.—Early June into September. *Fr*.—Early July through autumn.

Middle District.—Freehold (C), Keyport (C), Shark River (Kn), Farmingdale, Birmingham, Pemberton (C), Mullica Hill (NB), Mantua, Mickleton (NB), Camden (C), Swedesboro.

SANICULA L.

***Sanicula marilandica* L. Sanicle.**

Sanicula marilandica Linnæus, Sp. Pl. 235. 1753 [Maryland and Virginia].

—Knieskern 15.—Britton 113.

Woodland of the Northern and Middle districts, frequent.

Fl.—Late May to mid-June. *Fr*.—Early August to early September.

Middle District.—Squan (C), New Egypt, Vincentown (NB), Lindenwold (S), Camden (C), Swedesboro.

Cape May.—Bennett (S).

***Sanicula canadensis* L. Short-styled Sanicle.**

Sanicula canadensis Linnæus, Sp. Pl. 235. 1753 [Virginia].—Britton 113.

Woodland of the Northern and Middle districts, frequent; also occasional on the Coastal Strip on the Cape May peninsula.

Fl.—Late May to mid-June. *Fr.*—Early August to early September.

Middle District.—Delair, Camden (C), Lawnside (S), Oaklyn (S), Clementon.

Coast Strip.—Pt. Pleasant (S), Cox's Atlantic City, Wildwood (UP).

Cape May.—Dias Creek.

***Sanicula gregaria* Bicknell. Yellow-flowered Sanicle.**

Sanicula gregaria Bicknell, Bull. Torrey Bot. Club 22. 354. 1895 [Van Courtland Park, N. Y. City].

Known only from Swedesboro within our range, doubtless occurs in rich woods of the northern counties.

Fl.—Late May to mid-June. *Fr.*—Early August to early September.

ERYNGIUM L.

***Eryngium aquaticum* L. Rattlesnake Master.**

Pl. LXXXII., Fig. 2.

Eryngium aquaticum Linnæus, Sp. Pl. 232. 1753 [Virginia].

Eryngium virginianum Barton, Fl. Phila. I. 136.—Knieskern 15.—Willis 25.—Britton 113.

Common on the salt marshes of the coast from Spring Lake southward, and locally along Delaware Bay and the lower Delaware River, also on tidewater streams some distance from the shore. Recorded by Torrey from the marshes near Hoboken.

A peculiar plant, usually growing with sedges, grasses and other vegetation, its large compound umbels of bluish heads and spiny involucres presenting a peculiar misty appearance at a distance against the dark green of the salt meadows.

Fl. and *Fr.*—Late July into October.

Middle District.—Camden, Coopers Creek, Center Square, Swedesboro, Millville.

Coast Strip.—Sea Girt, Spring Lake (C), Squan (C), Bayhead, Toms River, Forked River, Island Hts., Cox's, Barnegat, Mouth of Batsto, West Creek (S), Absecon, Ocean City, Palermo (S), Petersburg (S), Ocean View, Mays Landing (NB), Sea Isle City (S), Wildwood, Anglesea, Tuckahoe (T), Clermont (T), Cold Spring, Bennett (S), Cape May.

***Eryngium yuccifolium* Michx. Tall Rattlesnake Master.**

Eryngium yuccifolium Michaux, Fl. Bor. Am. I. 164. [Virginia].—Willis 25.

Willis quotes Dr. Gray as authority for its occurrence in the Pine Barrens, and Dr. Britton gives it in his Catalogue as

occurring "in dry sand between Atsion and Quaker Bridge," on authority of Canby. There is a specimen in the herbarium of Mr. Benj. Heritage, collected by him in the "Pine Barrens, August 25th, 1897." Inadvertently he neglected to note the exact spot, but he thought it was obtained on a trip he took from Atsion to Quaker Bridge, which is curiously confirmatory of Canby's statement above quoted and of which Mr. Heritage was in ignorance.

Pine Barrens.—Atsion to Quaker Bridge? (BH).

CHÆROPHYLLUM L.

Chærophyllum procumbens (L.). **Spreading Chervil.**

Scandix procumbens Linnæus, Sp. Pl. 257. 1753 [Virginia].—Willis 27.—Britton 115.—Keller and Brown 239.

Occasional along the Delaware River from Mercer to Camden Counties, and reported by Torrey from "Hoboken Hills."

Fl.—Mid-April to early May. *Fr.*—Mid-May to early June.

Middle District.—Crosswicks, Bordentown (P), Delair, Fish House, Pavonia (P), Beverly, Westville, Below Gloucester (P).

WASHINGTONIA Rafinesque.

Washingtonia longistylis (Torr.). **Smooth Sweet Cicely.***

Myrrhis longistylis Torrey, Fl. U. S. 310. 1824 [Geneva, N. Y.].

Osmorhiza longistylis Britton 115.

Frequent in rich woods of the northern counties, rare southward to our limits.

Fl.—Early May to late May. *Fr.*—Late July to late August.

Middle District.—Crosswicks, Keyport (C), Camden (Bassett), Swedesboro.

ZIZAE Koch.

Zizia aurea (L.). **Golden Meadow Parsnip.**

Smyrniolum aureum Linnæus, Sp. Pl. 262. 1753 [North America].

**Washingtonia claytoni* (Michx.) Woolly Sweet Cicely.

Myrrhis claytoni Michaux, Fl. Bor. Am. I. 170. 1803 [Allegheny Mts.].

Frequent in rich woods in the northern counties, but not definitely known from within our limits. The only published records are from Middletown (Knieskern) and Camden (Martindale), neither of which I have been able to verify. All other specimens supposed to belong here prove to be *longistylis*.

Rich woods; reported from Warren and Hunterdon counties, and occurs rarely in the Middle and Cape May districts.

Fl.—Early May to early June. *Fr.*—Early August to early October.

Middle District.—Farmingdale.

Cape May.—Cold Spring, Cape May.

***Zizia cordata* (Walt.). Heart-leaved Meadow Parsnip.**

Smyrnium cordatum Walter, Fl. Car. 114. 1788. [South Carolina].

Frequent in parts of the northern counties and at one station in the Middle district.

Fl.—Early May to early June. *Fr.*—Early August to early October.

Middle District.—Five miles south of Mickleton.

CICUTA L.

***Cicuta maculata* L. Water Hemlock.**

Cicuta maculata Linnæus, Sp. Pl. 256. 1753 [Virginia].—Britton 114.

Common in swamps and along streams in the Northern, Middle and Coast districts and on both sides of the Cape May peninsula.

The most abundant umbelifer of our region, in practically every swamp outside the limits of the Pine Barrens.

Fl.—Mid-June to late August. *Fr.*—Mid-August into October.

Middle District.—Farmingdale, New Egypt, Burlington, Delaire, Hartford, Haddonfield (S), Camden (C), Mickleton (NB), Swedesboro.

Coast Strip.—Bayhead, Manumuskin (S), Barnegat City (L), Tucker's (L), Atlantic City (S), Mays Landing, Clermont, Ocean City (S), Anglesea (UP), Bennett, Cape May (S), Cape May Pt. (S), Dias Creek, Upper English Creek (T), Dennisville (S).

***Cicuta bulbifera* L. Bulb-bearing Water Hemlock.**

Cicuta bulbifera Linnæus, Sp. Pl. 255. 1753 [Virginia and Canada].—Barton, Fl. Phila. I. 143. 1818.—Britton 114.

Rare along the Delaware in Camden County and frequent in swamps of the northern counties.

Nuttall first found this plant in our region, along the Delaware, near Philadelphia, subsequently Parker recorded it from

Camden County, and recently Mr. Bayard Long collected it at Fish House.

Middle District.—Camden Co. (C), Fish House, Gloucester (P).

DERINGA Adanson.*

***Deringa canadensis* L. Honewort.**

Sison canadensis Linnæus, Sp. Pl. 252. 1753 [Virginia].

Cryptotania canadensis Willis 26.—Britton 115.

Common in woods of the northern counties and occasional in the upper Middle district.

Fl.—Early June to early July. *Fr.*—Late August to late September.

Middle District.—Freehold (C), New Egypt, Pemberton (C), Camden (C), Washington Park, Mickleton (H).

SIUM L.

***Sium cicutæfolium* Gm. Hemlock Water Parsnip.**

Sium cicutæfolium Gmelin, Syst. II. 482. 1791 [Siberia].—Britton 114.—Keller and Brown 241.

Sium latifolium Barton, Fl. Phila. I. 141. 1818.

Sium lineare Barton, Fl. Phila. I. 141. 1818.—Willis 26.

Frequent in swamps of the northern counties and coastal strip, and along the Delaware in West Jersey.

This species and *Oxypolis rigidior* are frequent associates of *Cicuta maculata*, but are neither of them so generally distributed. The present plant seems to prefer larger, wetter swamps, and is, I think, most abundant along the coast.

Fl.—Mid-July to late September. *Fr.*—Late August through October.

Middle District.—Monmouth Co. (Willis), Burlington, Delair, Kaighns Pt., Mickleton (KB), Swedesboro, Salem (S), Bridgeport (KB).

Coast Strip.—Long Branch, Forked River (CDL), Bay Head, Barnegat City (L), Surf City (L), West Creek, Crowleytown, Absecon (S), Ocean City, Piermont (S), Anglesea, Wildwood, Tuckahoe (S), Cold Spring, Court House.

* *Tænidia integerrima* (L.). Yellow Pimpernel. *Smyrniium integerrimum* Linnæus, Sp. Pl. 263. 1753 [Virginia]. Frequent in rocky places in the northern counties, but its occurrence within our limits rests entirely upon Knieskern's statement that it is found rarely on shady banks and in open woods in Monmouth and Ocean Counties. We have been unable to verify this statement.

PTILIMNIUM Rafinesque.***Ptilimnium capillaceum* (Michx.). Mock Bishop-weed.***Ammi capillaceum* Michaux, Fl. Bor. Am. I. 164. 1803 [Carolina].—

Barton Fl. Phila. I. 138. 1818.

Discopleura capillacea Knieskern 16.—Willis 26.*Discopleura major* Britton 116.*Ptilimnium capillaceum* Keller and Brown 241.

Common on the salt marshes of the coast and up Delaware Bay. Occasional in fresh swamps (introduced?).

The finely divided leaves of this little umbelifer, with their almost thread-like divisions, are to be found often buried by taller vegetation along the whole Coastal strip where salt and fresh meadows merge one into the other. Its occurrence inland is probably due to artificial introduction with soil or sand from near the coast, but it seems to thrive quite well beyond all maritime influence.

Fl.—Mid-July to late September. *Fr.*—Late August through autumn.

Middle District.—New Egypt, Pemberton Jnc., Kaighns Pt.

Maritime.—Long Branch, Pt. Pleasant, Bay Head, Toms River (S), Ocean Beach (T), Spray Beach (L), Manahawkin Beach, Absecon, Atlantic City, Piermont, Anglesea, Wildwood, Palermo (S), Tuckahoe (T), Cape May, Upper English Creek (T), Beaver Dam.

LILÆOPSIS Greene.***Lilæopsis lineata* Michaux. *Lilæopsis*.**

Pl. XC., Fig. 3.

Hydrocotyle lineata Michaux, Fl. Bor. Am. I. 162. 1803 [S. Carolina].*Crantzia lineata* Nuttall. Gen. I. 178. 1818.*Lilæopsis lineata* Stone. Bartonia I. 20. 1909.

Very rare on the salt marshes of the coast.

This humble little plant was first detected in New Jersey by Thomas Nuttall, who found it growing on the salt meadows near "Egg Harbor"—apparently near Beesley's Point.

On August 30, 1909, in company with Mr. S. S. Van Pelt, I found it on the marshes below Palermo, in the same neighborhood and heralded the event as the rediscovery of the plant* as I could find no record of its having been collected in the State

* Bartonia I., p. 20, 1909.

since Nuttall's time. It now develops, however, that Mr. K. K. Mackenzie had collected *Lilæopsis* between Mantoloking and Chadwick, on the shores of Barnegat Bay, although the fact had never been recorded. I am indebted to him for a specimen from his locality.

At Palermo the little plants were creeping over the white sand of a slight depression where a fresh water spring bursts forth near the edge of the salt marsh.

Fl.—Early July probably into August. *Fr.*—Late September probably into October.

Coast Strip.—Between Mantoloking and Chadwick on shores of Barnegat Bay (Mackenzie), Below Palermo, Near Egg Harbor (same as last?)

THASPIUM Nuttall.*

***Thaspium trifoliatum* L. Purple Meadow Parsnip.**

Thapsia trifoliata Linnæus, Sp. Pl. 262. 1753 [Virginia].

Thaspium aureum var. *trifoliatum* Britton 117.

Occasional in open woods in the Middle district, north to Union, Hunterdon and Middlesex Counties.

Fl.—Late May to late June.

Middle District.—Farmingdale, Pemberton, Merchantville (P), Medford (S), Sewell (S), Swedesboro.

ANGELICA L.

***Angelica villosa* (Walt.). Pubescent Angelica.†**

Ferula villosa Walter, Fl. Car. 115. 1788 [S. Carolina].

Archangelica hirsuta Knieskern 16.

Angelica villosa Britton 117.

Occasional in dry woods or clearings in the northern counties, and southward in the Middle district and in lower Cape May County.

* *Thaspium barbinode* is given in Keller and Brown's list from Magnolia on authority of Dr. Harshberger, but the record cannot be verified. Knieskern gives it from Prospertown, but the record cannot be verified. *T. aureum* seems to be erroneously referred to this region; all specimens so labelled are *Zizia aurea*.

† *A. atropurpurea* is recorded in Britton's Catalogue from Moorestown, Vineland and Salem, but there are no specimens preserved, and as our field work has utterly failed to discover it I am convinced that these records must refer to *A. villosa*. Dr. Stokes disclaims the Moorestown record, and the author of the Vineland one made other errors of identification.

Fl.—Mid-July to mid-August. *Fr.*—Late September into October.

Middle District.—Crosswicks, Lindenwold (S), Mickleton, Swedesboro, Fairton,.

Cape May.—Bennett, Cold Spring (OHB).

OXYPOLIS Rafinesque.

Oxypolis rigidior (L.). Cowbane.

Sium rigidius Linnæus, Sp. Pl. 251. 1753 [Virginia].

Oenanthe rigidius Barton, Fl. Phila. I. 142. 1818.

Archemora rigida Knieskern 16.

Tiedmannia rigida Britton 118.

Common in swamps throughout the Middle, Coast and Cape May districts north to Bergen, Middlesex and Mercer Counties; rare in the Pine Barrens.

Fl.—Mid-August to late September. *Fr.*—Mid-September to late October.

Middle District.—New Egypt, Burlington, Brown's Mills, Medford (S), Ashland, Haddonfield, Camden, Tomlin, Swedesboro.

Pine Barrens.—Landisville (T).

Coast Strip.—Toms River, Forked River, Waretown, Manahawkin, West Creek, Coxe's, Barnegat, Barnegat City (L), Mouth of Batsto, Absecon (S), Petersburg (S).

Cape May.—Court House (S), Cold Spring (S), Green Creek (S).

Oxypolis rigidior longifolia Pursh. Slender-leaved Cowbane.

Sium longifolium Pursh Fl. Am. Sept. 194. 1814 [New Jersey].

Oenanthe ambigua Nuttall Gen. I. 190. 1818 [Banks of the Delaware near Phila.].—Barton Fl. Phila. I. 143. 1818.

Apparently restricted to swamps of the Pine Barrens.

The distinguishing character of this form is the narrowness of the leaf segments (rarely over 4–5 mm.) rather than in the entire margin. They are in a majority of cases entire, it is true, but even the narrowest are sometimes lobed, while plants with leaf segments 18–20 mm. wide (*rigidior*) have them sometimes entire.

Fl. and Fr.—Apparently similar to the preceding.

Middle District.—Tomlinson's.

Pine Barrens.—Toms River (C), Bamber, Quaker Bridge (C), Speedwell (S), Mo. of Batsto, West Creek, Absecon (S), Hammonton (C), Petersburg (S), Mays Landing (S), Woodbine.

HERACLEUM L.

Heracleum lanatum Michx. Cow Parsnip.*Heracleum lanatum* Michaux, Fl. Bor. Am. I. 166. 1803 [Canada].—Britton 118.

Frequent in swamps of the northern counties, descending into our limits rarely, along the Delaware River.

Fl.—Early May to early June. *Fr.*—Mid-June to mid-July.

Middle District.—Crosswicks, Camden.

Family CORNACEÆ. Dogwoods.

Key to the Species.

- a. Flowers four parted, perfect, petals present.
 - b. Flowers greenish yellow, surrounded by four white obovate petal-like bracts 26–60 mm. long; fruits red. A tree. *Cornus florida*, p. 601
 - bb. Flowers white in flat terminal cymes, no involucre. Shrubs.
 - c. Leaves opposite.
 - d. Branchlets, stalks and lower surface of the leaves downy, often rusty; fruit blue, leaves ovate or elliptic.
 - C. anonum*, p. 602
 - dd. Branchlets smooth, gray; leaves whitish beneath, not downy, ovate lanceolate, taper pointed; fruit white.
 - C. paniculata*, p. 603
 - cc. Leaves alternate, clustered at the ends of the branches. Branchlets greenish streaked with white, leaves ovate or oval, whitish and minutely pubescent beneath, fruit white. *C. alternifolia*, p. 603
 - aaa. Flowers greenish, five parted, dioeciously polygamous, petals very minute or wanting; fruit bluish-black; leaves oval, glabrous and shining.
 - Nyssa sylvatica*, p. 603

CORNUS L.

Cornus florida L. Flowering Dogwood.

Cornus florida Linnæus, Sp. Pl. 117. 1753 [Virginia].—Knieskern 16.—Britton 120.—Stone, Barton I. 23. 1909.

Common in woods of the North and Middle districts, and occasional in the Coastal Strip and Cape May peninsula.

All through northern and western New Jersey the Dogwood is one of the most conspicuous trees of the woodland in spring time. Just as the countryside is tinged with the soft green of opening leaves and the yellow of the oak catkins, the great involucre bracts of the Dogwood, which pass popularly as petals,

grow out rapidly, forming great billowy masses of snowy-white, which remain very conspicuous in the woods until enveloped in the universal green of unfolding foliage.

In the Pine Barrens the tree is absent, but it grows right up to the eastern limit of the Middle district, and like many other "West Jersey" plants reappears in the narrow strip bordering the salt marsh of the coast and in the Cape May peninsula. As we cross the State by rail in mid-spring, we can tell the minute we are out of the Pine Barrens by the sudden flash of the white boughs of the Dogwood as we rush past.

Fl.—Late April to late May, from buds formed the previous season. *Fr.*—Early September to early October or through autumn.

Middle District.—New Egypt, Birmingham, Pemberton Jnc. (S), Bordentown, Pensauken, Medford (S), Springdale (S), Sicklerville (S), Westville, Wenonah, Woodbury, Mickleton, Swedesboro, Centerton, Quinton, Willow Grove (T), New Germany, Fairton (S).

Coast Strip.—Forked River, Palermo, Mays Landing (S).

Cape May.—Goshen (S), Sluice Creek (S), Court House (S), Cold Spring, Bennett, Cape May (S).

Cornus amomum* Mill. Kinnikinnik.

Cornus amomum Miller, Gard. Dict. Ed. 8, No. 5. 1768 [Virginia].

Cornus stolonifera Knieskern 16.—Willis 27.

Cornus sericea Britton 120.

Frequent along streams and in damp thickets in the Northern and Middle districts. Occasional on the coast.

A familiar shrub usually associated with *Viburnum dentatum* and *V. scabrellum* on the borders of swampy thickets, where it is not wet enough for alders or *Viburnum nudum*. The white panicles of Dogwoods, Viburnums and Elder are conspicuous in late spring or early summer and resemble one another not a little.

Fl.—Mid-June to early July. *Fr.*—Early August to late August, sporadically later.

*It seems almost certain that Knieskern's and Willis' record of *C. stolonifera* refers to this species, and so probably does the record for Woodstown given by Keller and Brown on authority of Miss Ware. There is no evidence and little likelihood of this species occurring within our range.

Middle District.—Farmingdale, Pemberton Jnc. (S), Vincentown, Medford (S), Locust Grove (S), Clementon (C), Oaklyn (S), Lawnside (S), Kirkwood (C), Fancy Hill, Kaighns Pt., Washington Park, Mickleton, Swedesboro.

Coast Strip.—Toms River.

Cape May.—Dias Creek (S).

***Cornus paniculata* L'Her. Panicked Dogwood.**

Cornus paniculata L'Heritier de Brutelle, *Cornus* IX., pl. 5. 1788 [North America].

Cornus candidissima Britton 120.—Keller and Brown 243.

Frequent or common in dry soil in the northern counties, and occasional southward in the Middle district.

Fl.—Early June to late June. *Fr.*—Early August to late August, sporadically later.

Middle District.—Farmingdale, New Egypt, Pemberton (C), Delanco (C), Mouth of Rancocas (C), Lindenwold, W. Collingswood (KB), Salem (H).*

***Cornus alternifolia* L. f. Alternate-leaved Dogwood.**

Cornus alternifolia Linnæus filius, Suppl. 125. 1781 [North America].—Britton 121.—Keller and Brown 244.

Frequent on the edges of woods in the northern counties, becoming less common southward in the Middle district.

Fl.—Mid-May to early June. *Fr.*—Mid-July apparently to early August.

Middle District.—Farmingdale, New Egypt, Bordentown, Kinkora, Pemberton (NB), Mantua (KB), Kirkwood, Lawnside (S), Magnolia (NB), Pitman, Woodstown (NB), Swedesboro.

NYSSA L.

***Nyssa sylvatica* Marsh. Sour Gum.**

Nyssa sylvatica Marshall, Arb. Am. 97. 1785 [Pennsylvania].—Britton 121.

Nyssa aquatica Barton, Fl. Phila., II. 192. 1818.

Nyssa multiflora Knieskern 16.

Common in woods throughout the State except in the mountains of Sussex and Warren counties; most abundant on the Coastal plain in swamps of the Pine Barrens, Middle and Cape May districts.

Fl.—Mid-May to mid-June. *Fr.*—Early September into October.

* Swedesboro record (KB) = *C. amomum*.

Middle District.—Farmingdale, New Egypt, Hainesport, New Lisbon, Kin-kora, Delanco, Medford (S), Lawnside (S), Oaklyn (S), Sicklerville (S), Kaighns Pt., Washington Park, Sewell (S), Glassboro, Pitman, Mickleton, Fairton (S), Dividing Creek.

Pine Barrens.—Lakehurst, Speedwell, Bear Swamp (S), Cedar Brook, Inskip, Albion, Folsom, Mays Landing (S).

Coast Strip.—Pt. Pleasant (S), Forked River, Waretown, Surf City (L), Ship Bottom (L), Piermont (S), Wildwood.

Cape May.—Court House (S), Green Creek (S), Cape May (S), Cape May Pt. (S).

Series II. GAMOPETALÆ.

*Key to the Herbaceous Species.**

- a. Flowers minute, closely crowded in involuclal heads, stamens usually united by their anthers forming a ring.
 - b. Flowers all expanded into ray flowers, juice milky. *Cichoriaceæ*, p. 718
 - bb. Flowers of the disc tubular, with or without a circle of ligulate ray flowers around the edge.
 - c. Stamens merely connivent, not actually united, pistillate involucre often bur like. *Ambrosiaceæ*, p. 724
 - cc. Stamens united by their anthers in a ring around the style (except in *Kuhnia*). *Compositæ*, p. 726
- aa. Flowers not in involuclal heads.
 - b. Upright or prostrate herbs.
 - c. Stamens more numerous than the lobes of the corolla.
 - d. Flowers irregular.
 - e. Petals 4, forming a sort of pendent sac, enlarged at the base, narrowed to a slightly flaring tip. *Fumariaceæ*, p. 461
 - cc. Petals 3, lower one keeled, others lateral, flaring. *Polygalaceæ*, p. 519
 - dd. Flowers regular.
 - e. Shrubby plants, flowers white or pink. *Ericaceæ*, p. 612
 - ee. Low delicate herbs with three-parted leaves and yellow or violet flowers. *Oxalidaceæ*, p. 516
 - cc. Stamens equal to or less than the lobes of the corolla.
 - d. Corolla regular.
 - e. Stamens equal in number to the corolla lobes.
 - f. Leaves in a single whorl at the top of the stem, flower white, star-like. *Trientalis*, p. 633
 - ff. Leaves all basal.
 - g. Flowers greenish, in a long, slender or short globular head. *Plantaginaceæ*, p. 698
 - gg. Flowers lavender, in a branching panicle. *Limonium*, p. 633

* Trees, shrubs and aquatic plants are included in the keys on pp. 380-390.

fff. Leaves opposite.

g. Reduced to mere appressed scales. *Bartonia*, p. 642

gg. Somewhat fleshy, clustered at the end of the short stem, 6-15 cm. tall. Flowers and whole plant purplish, lower leaves scale-like. *Obolaria*, p. 643

ggg. Leaves normally developed.

h. Abruptly narrowed to winged connate perfoliate base, flowers axillary. *Triosteum*, p. 711

hh. Leaves not narrowed to a perfoliate or clasping base.

i. Flowers yellow.

j. Leaves serrate. *Diervilla*, p. 712

jj. Leaves entire.

k. Flowers in a terminal, spike-like raceme. *Lysimachia*, p. 631

kk. Flowers in axillary fascicles on long, slender pedicels.

Steironema, p. 632

ii. Flowers blue.

j. Stamens exserted. *Trichostema*, p. 664

jj. Stamens not exserted.

k. Plant low, 7-18 cm., corolla 8-12 mm. broad, basal leaves spatulate, upper small oblong sessile.

Houstonia, p. 701

kk. Plant over 20 cm. tall, corolla 25 mm. long or more. *Gentiana*, p. 640

iii. Flowers neither pure blue nor yellow.

j. Leaves serrate.

k. Flowers in whorls, often forming interrupted terminal spikes, flowers purple. *Mentha*, p. 673

kk. Flowers in long, slender spikes, axillary and terminal flowers violet or white. *Verbenia*, p. 660

jj. Leaves entire.

k. Plants low, prostrate or trailing.

Rubiaceæ, p. 700

kk. Plants erect.

l. Flowers star-like, bright pink or white. *Gentianaceæ*, p. 638

ll. Flowers small, bell shaped, white, tinged with pink or greenish, juice milky.

Apocynum, p. 645

lll. Flowers with reflexed sepals and a rotate crown of five hooded bodies on the tube of the stamens, juice milky.

Asclepias, p. 646

- ffff. Leaves in several whorls.
 g. Flowers minute, white, greenish or purplish. *Galium*, p. 704
 gg. Flowers yellow, showy. *Lysimachia*, p. 631
 ggg. Flowers pink or green and white, with reflexed sepals and crown, juice milky. *Asclepias*, p. 646
 ffff. Leaves alternate (or a few opposite).
 g. Leaves pinnate, lobes deeply serrate. *Hydrophyllum*, p. 657
 gg. Leaves slightly serrate, flowers bell shaped, white, 6 mm. long, stem weak and reclining. *Campanula*, p. 714
 ggg. Leaves orbicular, amplexicaul, crenate, flowers rotate, 12 mm. broad, purple. *Specularia*, p. 715
 gggg. Leaves coarsely toothed, large coarse herbs, 3-15 dm. tall, flowers 75 mm. long, white or purplish. *Datura*, p. 674
 ggggg. Leaves entire.
 h. Glabrous or slightly soft pubescent.
 i. Flowers blue, 15 mm. long, leaves 125 × 60 mm. *Mertensia*, p. 658
 ii. Flowers white, 50 mm. long. *Convolvulus*, p. 653
 iii. Flowers yellow, 12 mm. across, seed in an inflated involucre. *Physalis*, p. 675
 iiii. Flowers very minute, white, leaves 18 × 12 mm. *Samolus*, p. 631
 hh. Minutely roughened or scabrous or rough hairy, terminal part of inflorescence often coiled. *Boraginaceæ*, p. 658
 cc. Stamens less in number than the lobes of the corolla.
 f. Leaves all basal. *Plantago*, p. 698
 ff. Leaves cauline.
 g. Plants erect, 3 dm. or more high.
 h. Leaves serrate, opposite.
 i. Flowers in terminal, slender spikes. *Verbena*, p. 660
 ii. Flowers in axillar whorls. *Lycopus*, p. 672
 iii. Flowers in terminal, globular clusters. *Valerianella*, p. 713
 hh. Leaves serrate in whorls. *Leptandra*, p. 683
 hhh. Leaves entire, hairy, flowers blue, 25 mm. long. *Ruellia*, p. 696
 gg. Plants creeping or low, less than 3 dm. high, flowers minute, blue or white. *Veronica*, p. 682
 dd. Corolla irregular.
 e. Anther-bearing stamens 5.
 f. Flowers white or yellow. *Verbascum*, p. 675
 ff. Flowers blue. *Echium*, p. 658

- ee. Anther-bearing stamens 2 or 4.
 - f. Stems leafy.
 - g. Stem 4-angled.
 - h. Leaves opposite, plants aromatic, flowers two-lipped. *Labiatae*, p. 661
 - hh. Plants not aromatic. *Scrophulariaceae*, p. 675
 - gg. Stem not 4-angled (or if so, not aromatic).
 - h. Stamens united by their anthers into a tubular ring. *Lobelia*, p. 715
 - hh. Stamens not united.
 - i. Leaves opposite.
 - j. Flowers in heads on pedicles 1-1.5 dm. long, leaves entire. *Dianthera*, p. 697
 - jj. Flowers minute, scattered in long slender terminal and axillary spikes.
 - k. Reflexed in fruit. *Phryma*, p. 697
 - kk. Not reflexed in fruit. *Verbena*, p. 660
 - jjj. Flowers single axillary, or in short terminal spikes. *Scrophulariaceae*, p. 675
 - ii. Leaves alternate. *Scrophulariaceae*, p. 675
 - ff. No normal leaves; leaves reduced to scales; flowers spurred, yellow (or minute, brownish). *Utricularia*, p. 688
- bb. Trailing or climbing vines.
 - c. Stems bright orange, on bushes, etc., no leaves. *Cuscuta*, p. 654
 - cc. Stems normal, leaves present.
 - d. No tendrils present.
 - e. Plant trailing on the ground.
 - f. Flowers two (twin) white, terminating the branches. *Mitchella*, p. 703
 - f. Flowers in small heads, on pedicels 50-75 mm. long. *Lippia*, p. 661
 - fff. Flowers axillary, solitary, yellow. *Lysimachia*, p. 631
 - ee. Plant trailing over bushes, etc., or sometimes on the ground.
 - f. Flowers white, pink or blue; large, funnel-form, 25 mm. or more in length. *Convolvulaceae*, p. 652
 - ff. Flowers greenish, purplish or white minute; leaves whorled. *Galium*, p. 704
 - fff. Flowers purple, wheel-shaped, with projecting connivent stamens. *Solanum*, p. 675
 - ffff. Flowers trumpet-shaped, bright red *Lonicera*, p. 712
 - dd. Tendrils present. Flowers greenish in clusters, leaves 5-lobed or angled. *Cucurbitaceae*, p. 713

Order ERICALES.

Family CLETHRACEÆ. Sweet Pepper Bushes.

CLETHRA L.

Clethra alnifolia L. Sweet Pepperbush.

Pl. XCII., Fig. 2.

Clethra alnifolia Linnæus, Sp. Pl. 1057. 1753 [North America].—Barton, Fl. Phila. 204. 1818.—Knieskern 20.—Britton 163.—Keller and Brown 244.

Swamps; frequent or common throughout our district, occurring to the north, mainly on the coastal plain, but also at Budds Lake and Lake Hopatcong.

This is a characteristic shrub of all the swamps of the coastal plain. Its fragrance fills the air after the somewhat similar odor of the swamp Magnolia of early summer has passed away, while its handsome white flower spikes furnish a touch of color at a time when few other shrubs are in bloom.

At Manahawkin it is called Soap Bush, from the idea that the flowers when rubbed together in water make a sort of soapy lather. Our results have not been very startling, however.

Fl.—Late July to early September.

Middle District.—New Egypt, Fish House, Kaighns Pt., Tomlin (S), Blackwood, Clementon, Salem (S), Dividing Creek.

Pine Barrens.—Toms River (S), New Lisbon, Forked River, Jones Mill (S), Speedwell, Bear Swamp (S), Landisville (T), Hammonton, Mouth of Batsto River, Pleasant Mills, Egg Harbor City.

Coast Strip.—Pt. Pleasant (S), Surf City (L), Harvey Cedars (L), Ship Bottom (L), Beesleys Pt. (S).

Cape May.—Cape May.

Family PYROLACEÆ. Wintergreens.

Key to the Species.

a. Leaves all basal, oval or orbicular.

b. Flowers 6-8 mm. broad in a distinctly one-sided raceme, leaves distinctly crenate. *Pyrola secunda*, p. 610

bb. Flowers 10-18 mm. broad, raceme not one-sided, leaves obscurely crenate or entire.

c. Calyx lobes oblong or lanceolate, leaves shining.

P. americana, p. 609

cc. Calyx lobes ovate or triangular, leaves dull.

d. Blades orbicular, usually shorter than the petioles, 12-25 mm. long. *P. chlorantha*, p. 609

dd. Blades oval, longer than the petioles, 35-45 mm. long.

P. elliptica, p. 609

aa. Leaves opposite or verticillate, lanceolate or spatulate.

b. Leaves mottled with white.

Chinaphila maculata, p. 610

bb. Leaves uniform, green, shining.

C. umbellata, p. 610

PYROLA L.

***Pyrola americana* Sweet. Round-leaved Wintergreen.**

Pl. XXXVIII., Fig. 2.

Pyrola americana Sweet, Hortus Britannicus, Ed. 2. 341. 1830, n. n. for *P. rotundifolia* Pursh, non Eng. Botanists [Canada-Carolina].*

Pyrola rotundifolia Knieskern 21.—Britton 162.

Frequent in woodlands of the northern counties, and less abundant in the Middle and Pine Barren districts. Occasional on the Cape May peninsula.

Fl.—Late June to mid-July.

Middle District.—Farmingdale, Haddonfield, Medford (S), Mickleton (H), Yorktown, Bridgeton (NB).

Pine Barrens.—Waretown, Landisville, Hammonton (C), Atco (C), Pan-coast (T), Mays Landing (S).

Cape May.—Court House, Bennett (S).

***Pyrola elliptica* Nutt. Oval-leaved Wintergreen.**

Pyrola elliptica Nuttall, Gen. I. 273. 1818 [Philadelphia and woods of New Jersey].—Britton 163.

Frequent in woods of the northern counties and Middle district.

Fl.—Mid-June to early July.

Middle District.—Phalanx (NB), New Egypt, Moorestown (C), Medford (S), Camden Co. (C), Glassboro (P), Swedesboro, Bridgeton (C).

Pine Barrens.—Hammonton (Bassett).

***Pyrola chlorantha* Sw. Greenish-flowered Wintergreen.**

Pyrola chlorantha Swartz, Vet. Akad. Handl. 1810. 190. Pl. 5 [Sweden].—

Nutt. Gen. I. 274. 1818.—Barton, Fl. Phila. 202. 1818.—Britton 163.—

Keller and Brown 245.

Woods of the Northern and upper Middle districts; everywhere local and not abundant. Very rare in the Pine Barrens.

Described as a new species *P. convoluta* by Barton, Prodrum. Fl. Phila., from the "woods of New Jersey," where Nuttall also

* Cf. Fernald *Rhodora*, 1904, p. 195.

states that it is abundant, specifying "sandy pine forests near Philadelphia."

Fl.—Late May to mid-June.

Middle District.—Fairhaven (C), Farmingdale, Pemberton (C), Moorestown, Camden (P), Medford, Sumner.

Pine Barrens.—Cedar Brook, Greenbank (Bassett) [prob. "Hammonton" (C)].

***Pyrola secunda* L. One-sided Wintergreen.**

Pyrola secunda Linnæus, Sp. Pl. 396. 1753 [Europe].—Pursh, Fl. Am. Sept. I. 299. 1814.—Britton 163.—Keller and Brown 245.

Woods of the Northern and upper Middle districts; rare and local within our limits.

Fl.—Early June to late June.

Middle District.—Freehold (C), Farmingdale, Camden Co. (P), Medford, Blackwood (KB).

CHIMAPHILA Pursh.

***Chimaphila maculata* (L.). Spotted Pipsissewa.**

Pl. XCI.

Pyrola maculata Linnæus, Sp. Pl. 396. 1753 [North America].—Barton, Fl. Phila. 204. 1818.—Knieskern 21.—Britton 163.

Dry woods; frequent throughout the State.

Fl.—Late June to mid-July.

Middle District.—Freehold (NB), New Egypt, Birmingham, Arney's Mt. (S), Brown's Mills, Haddonfield (S), Medford (S), Tomlin (S), Swedesboro, Yorktown, Centerton (S), Bridgeton (S).

Pine Barrens.—Albion, Inskip, Hammonton (Bassett), Manumuskin (S).

Coast Strip.—Pt. Pleasant (S), Forked River, Manahawkin, Atlantic City (S), Palermo (S), Beesley's Pt. (S), Mays Landing (S), Holly Beach.

Cape May.—Bennett, Cold Spring (OHB).

***Chimaphila umbellata* (L.). Plain Pipsissewa.**

Pyrola umbellata Linnæus, Sp. Pl. 396. 1753 [Europe, Asia and North America].—Barton, Fl. Phila. 203. 1818.—Knieskern 21.—Britton 163.

Dry woods of the Northern, Middle and Cape May districts; not nearly as abundant as the preceding in our territory; very rare in the Pine Barrens.

Fl.—Late June to mid-July.

Middle District.—New Egypt, Birmingham, Medford (S), Swedesboro, Union Grove (S), Fairton (S).

Pine Barrens.—Inskip, Hammonton (Bassett).

Cape May.—Cold Spring (OHB), Green Creek.

Family MONOTROPACEÆ. Indian Pipes.

Key to the Species.

- a.* Flower solitary, plant white—rarely pinkish—drying black. *Monotropa*, p. 611
- aa.* Flowers racemose, plant yellowish, often tinged with red. *Hypopitys*, p. 611

MONOTROPA L.

Monotropa uniflora L. Indian Pipe.

Pl. XCIII., Fig. 2.

Monotropa uniflora Linnæus, Sp. Pl. 387. 1753 [Maryland, Virginia and Canada].—Knieskern 21.—Britton 164.

Woodlands; frequent in the Northern and Middle districts, less common in the Cape May peninsula and apparently quite rare in the Pine Barrens.

This curious ghostly, fungus-like plant seems rather out of place in the sandy woods of New Jersey, as we usually associate it with the deep rich forests of the higher grounds, but it seems to flourish very well right up to the edge of the Pine Barrens themselves.

Fl.—Early June into September or even October.

Middle District.—Farmingdale, New Egypt, Kenilworth (S), Haddonfield (S), Orchard (S), Medford (S), Lawnside (S), Tomlin (S), Clementon, Sicklerville (S), Yorktown.

Pine Barrens.—Pt. Pleasant, Manahawkin, Williamstown Jnc., Newtonville.

Cape May.—Bennett (S), Cape May.

HYPOPITYS Hill.

Hypopitys hypopithys (L.). Pine Sap.

Monotropa Hypopithys Linnæus, Sp. Pl. 387. 1753 [Europe and Canada].—Knieskern 21.

Hypopithys lanuginosa Barton, Fl. Phila. 200. 1818.

Hypopitys monotropa Britton 164.

Woodlands; rather frequent in the Northern and Middle districts, rare in the Cape May peninsula and occasional on the eastern edge of the Pine Barrens.

The two nominal forms *H. americana* and *H. lanuginosa* are represented in our material, but they do not appear to be separable by any good constant differences.

Fl.—Early July into September or even October.

612 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—N. Spring Lake (NB), New Egypt, Arney's Mt. (S), Brown's Mills, Kaighns Pt., Oaklyn (S), Bridgeton (S).

Pine Barrens.—Landisville, Manumuskin (S), Manahawkin.

Cape May.—Anglesea Inc. (S), Bennett.

Family ERICACEÆ. Heath, etc.

Key to the Species.

- a. Petals separate white, leaves 6-14 mm. long, crowded, oval, thick, obtuse, shining; an evergreen shrub 1-4 dm. high. *Dendrium*, p. 615
- aa. Petals united.
 - b. Corolla funnel-form, campanulate or saucer-shaped.
 - c. Funnel-form or salver form.
 - d. A trailing vine, flowers pink and white 10-15 mm. long, leaves orbicular 12-30 x 25-70 mm. *Epigæa*, p. 619
 - dd. Shrubs; flowers 35-50 mm. long, leaves oblanceolate or obovate.
 - e. Flowers pink, appearing before the leaves expand. *Azalea nudiflora*, p. 612
 - ee. Flowers white, clammy, appearing after the leaves have expanded.
 - f. Leaves glaucous. *A. viscosa glauca*, p. 614
 - ff. Leaves not glaucous. *A. viscosa*, p. 613
 - cc. Corolla campanulate, 35-50 mm. broad, white or tinged with pink, with yellowish dots within. Leaves 10-20 x 3-6 cm., evergreen. *Rhododendron*, p. 614
 - ccc. Corolla saucer-shaped, leaves oblong to oval, evergreen.
 - d. Flowers 6-10 mm. broad, deep pink, leaves 30-60 mm. long. *Kalmia angustifolia*, p. 616
 - dd. Flowers 16-25 mm. broad, white or pink, leaves 5-13 mm. long. *Kalmia latifolia*, p. 616
 - bb. Corolla small, urn-shaped pendant, white, or pink tinted.
 - c. Trailing vine, leaves spatulate, 12-25 mm. long, evergreen. *Arctostaphylos*, p. 621
 - cc. Low shrub, 50-150 mm. high from a subterranean stem; leaves, oval clustered at the ends of the branches, 25-50 mm. long, evergreen. *Gaultheria*, p. 620
 - ccc. Erect shrubs.
 - d. Flowers 6-8 mm. long, in conspicuous second racemes.
 - e. Low bog shrub, 6 dm. high. *Chamædaphne*, p. 619
 - ee. Tall shrub, 12-18 dm. high. *Leucothoe*, p. 617
 - dd. Flowers 10-12 mm. long in lateral umbels. Low shrub, 3-6 dm. high. *Pieris*, p. 618
 - ddd. Flowers 3 mm. long, in terminal, often dense panicles. *Xolisma*, p. 618

AZALEA L.

Azalea nudiflora L. Pink Azalea, Wild Honeysuckle.

Pl. XCV.

Azalea nudiflora Linnæus, Sp. Pl. Ed. 2. 214. 1762 [Virginia].—Barton, Fl.

Phila. 113, 1818.—Knieskern 20.

Rhododendron nudiflorum Britton 162.

Common in woodlands of the Northern and Middle districts, occasional in the Cape May peninsula, and very rare in the Pine Barrens.

While frequent in the woods of West Jersey, this *Azalea* is by no means typical of the coastal plain, the following species being the characteristic species of the region.

A specimen from Mickleton represents the form known as *A. nudiflora glandifera* Porter (Bull. Torrey Bot. Club XXVII, 508, 1900).

Fl.—Early May to late May, appearing before or with the leaves. *Fr.*—Early July to late July.

Middle District.—New Egypt, Bordentown, Birmingham, Medford (S), Camden (P), Westville, Gloucester, Woodbury, Mickleton, Swedesboro, Quinton.

Pine Barrens.—Hammonton, Speedwell.

Cape May.—Cold Spring (OHB).

***Azalea viscosa* L. White Azalea.**

Pl. LVIII., Fig. 2.

Azalea viscosa Linnæus, Sp. Pl. 151. 1753 [Virginia].—Barton, Fl. Phila. 113. 1818.—Knieskern 20.

Rhododendron viscosum Britton 162.

Azalea viscosa nitida Keller and Brown 246.

Common in swamps throughout the coastal plain and at several stations in Sussex, Warren and Morris Counties in the mountains. Very abundant in the Pine Barrens, but rather rare on the coast islands and lower Cape May peninsula.

One of our most attractive Pine Barren shrubs. Its white flower clusters fill the swamps with a delicate heliotrope-like fragrance, following close upon the *Magnolia* and lasting until the white spikes of the *Clethra* are ready to take their place. The three keep the swamps redolent with perfume nearly the whole summer through.

Fl.—Early June to early July, sporadically somewhat later, appearing after the leaves. *Fr.*—Early September to early October apparently.

Middle District.—Farmingdale, Pensauken (S), Brown's Mills, Kaighns Pt., Haddonfield (KB), Medford, Westville, Washington Park, Mickleton, Swedesboro, Yorktown, Elmer (P), Union Grove (S), Dividing Creek.

Pine Barrens.—Manchester, Davenport, Forked River, W. Plains (S), Albion, Malaga (P), Andrews', Ancora, Inskip, Winslow Jnc., Egg Harbor City.

Coast Strip.—Beach Haven Crest (L), Holgate's (L), Beesley's Pt. (S).

Cape May.—Bennett.

Azalea viscosa glauca Michx. Glauous Azalea.

Azalea viscosa glauca Michaux, Fl. Bor. Am. I. 151. 1803 [Lower Carolina].

—Keller and Brown 246.

Rhododendron viscosum glaucum Britton 162.

Frequent with the preceding, but not so plentiful. This is not a geographic form in any sense, but seems to occur wherever the true *viscosa* is found.

Fl.—Apparently slightly later than the last.

Middle District.—Spring Lake (C), Mickleton 7 miles west (= Repaupo); Swedesboro, Union Grove (S).

Pine Barrens.—Allaire, Lakehurst, Forked River, Hammonton, Inskip.

Coast Strip.—Peahala (L), Beach Haven Crest (L), Cold Spring.

RHODODENDRON L.

***Rhododendron maximum* L. Rhododendron.**

Pl. XCIV., Fig. 1.

Rhododendron maximum Linnaeus, Sp. Pl. 392. 1753 [Virginia].—Willis 39.

—Britton 161.—Keller and Brown 247.

Rhododendron maximum album Pursh, Fl. Am. Sept. I. 297. 1814.

Along streams and lakes at various points in the northern counties and down the Delaware to Florence Heights. Also at two isolated localities in Cedar Swamps in the Pine Barrens.

The occurrence of the *Rhododendron* in the flat plains of the Pine Barrens has always been a surprise to me. Associated as it is in my mind with cool shaded slopes of the mountains, it seems entirely out of place in South Jersey.

Pursh seems to have been the first one to have recorded its occurrence here, as he mentions under the habitat of the species "Shady Cedar Swamps, New Jersey and Delaware."

The stations are remote and not easy of access, so that the plant is not threatened with annihilation as it would be in more frequented spots.

On July 9, 1910, I visited a colony near Sicklerville. My own efforts on a previous trip having failed to discover it, I was fortunate in obtaining directions from a native who had been

to the "Oleander patch" several times. Entering a low wood I walked for perhaps two hundred yards on a gradual descent until I reached a point where white cedars began to appear, and soon the ground pitched steeply down to the characteristic sphagnum bottom of the cedar swamp, with great rank growths of ferns, *Woodwardias*, *Osmunda cinnamomea* and *Dryopteris simulata*. The cedars rose on every hand like tall columns, their dense tops shutting off much of the light, and under them, with tangled and twisted trunks and branches, grew the Rhododendrons, the masses of white blossoms standing out conspicuously against the dark leaves and the general gloom. The high humidity, the absolute lack of motion in the air, and the low basin-like character of the spot made it extremely oppressive and the atmosphere seemed fairly reeking with moisture.

I have suffered from excessive perspiration in the Rhododendron thickets of the Alleghenies much as I did that day in the cedar swamp, and perhaps the similarly humid conditions are what the plant needs. It was interesting to note growing with it another straggler from the north, *Illicioides mucronata*, brought evidently by the same climatic upheaval which drove the Rhododendron so far to the south of its usual range. The swamp stretched away on all sides, and one might wander for hours through its gloomy depths without finding this little thicket, or without finding the way out again, if it were not for the path that had been opened up by woodchoppers. Another larger patch of Rhododendrons has been seen by gunners in winter time in the swamps bordering the upper Egg Harbor River, but I could find no one who had visited it in summer, and those who had stumbled upon it in autumn or winter could not find their way back again.

Fl.—Late June to late July. *Fr.*—Early August into autumn.

Middle District.—Bordentown, Kinkora, Florence (C).

Pine Barrens.—Near Sicklerville, Near Atsion.

DENDRIUM Desvaux.

Dendrium buxifolium (Berg.). Sand Myrtle.

Pl. XCVI., Fig. 2.

Ledum buxifolium Berg, Act. Petrop. I: 213. 1778 [New Jersey].

Ammyrsine buxifolia Pursh, Fl. Am. Sept. I. 301. 1814.

Leiophyllum buxifolium Knieskern 20.—Willis 39.—Britton 161.

Dendrium buxifolium Keller and Brown 247.

Frequent in damp sand of the Pine Barrens, usually in open situations, finding here the northern limit of its range.

This curious little evergreen, like a miniature Box-bush, is typical of the very center of the Pines and does not range in New Jersey beyond the limits of this region. The white flowers, which it bears in great abundance, prove very attractive to various insects, and entomologists frequently haunt the patches of Sand Myrtle when searching for rarities.

Fl.—Early May (rarely late April) to early June. *Fr.*—Early July through summer.

Pine Barrens.—Brindletown, Lakewood (NB), Lakehurst (NB), Toms River, Brown's Mills, New Lisbon, Bamber, Forked River, Barnegat, East Plains, Speedwell, Bear Swamp, Taunton, Clementon, Atco, Jackson (P), Waterford (P), Cedar Brook, Landisville (T), New Germany (T), Winslow Jnc., Hammonton, Batsto (S), Pleasant Mills, Mays Landing.

KALMIA L.*

Kalmia angustifolia L. Sheep Laurel.

Kalmia angustifolia Linnæus, Sp. Pl. 391. 1753 [Pennsylvania, New Jersey and New York].—Knieskern 20.—Britton 161.

Kalmia glauca Barton, Fl. Phila. 199. 1818.

Frequent in sandy ground, especially about the edges of bogs, everywhere except in the Cape May peninsula, where we have no record south of Dennisville. Most abundant in the Pine Barrens, where it often covers large areas.

Fl.—Late May to late June. *Fr.*—Late August through autumn.

Middle District.—Farmingdale, New Egypt, Washington Park, Glassboro, Lindenwold (S), Sewell (S), Swedesboro.

Pine Barrens.—Toms River, Brown's Mills, Bamber, Forked River, Coxe's, East Plains, West Plains (S), Tabernacle, Taunton, Albion, Jackson, Andrews, Cedar Brook, Landisville (T), Hammonton (Bassett), Pleasant Mills, Egg Harbor City, Dennisville (OHB).

Coast Strip.—Spray Beach (L), Peahala (L), North Beach Haven (L), Holgate's (L).

Kalmia latifolia L. Laurel.

Pl. LXIV., Fig. 1.

Kalmia latifolia Linnæus, Sp. Pl. 391. 1753 [Maryland, Virginia and Pennsylvania].—Barton, Fl. Phila. 199. 1818.—Knieskern 20.—Britton 161.

* Named for Peter Kalm (1715-1779), the Swedish explorer, who visited America 1748-51, and brought back many plants to Linnæus.

Throughout the State, except on the Cape May peninsula, where we have no record south of Goshen. Common in both dry and moist situations; an abundant plant in the Pine Barrens.

The Pines seem to be the chosen land of the *Ericaceæ*, which abound there both in species and individuals. As we visit them in early spring in search of the finest *Arbutus* that I know of, so by the end of June we may be sure of finding the greatest display of Laurel that can be found anywhere in the Middle States even on the mountains themselves, which are supposed to be its proper home. It is snow white in shady spots and reaches a height of six to eight feet, while in open ground, even out on the plains, it grows in low rounded bushes with flowers of the deepest pink. Unfortunately, the demand for bushes to plant on the estates of the wealthy has caused the nurseryman to nearly exterminate it in some parts of South Jersey, and many car loads have been hauled out of the State.

Fl.—Late May to late June. *Fr.*—Late August into autumn.

Middle District.—Farmingdale, New Egypt, Crosswicks, Birmingham, Arney's Mt. (S), Medford (S), Washington Park, Eight miles from Mickleton, Swedesboro.

Pine Barrens.—Bayhead, Toms River, Brown's Mills, Bamber, Forked River, Barnegat, Manahawkin, West Creek, East Plains, W. Plains (S), Coxe's, Bear Swamp (S), Sumner, Albion, Atco, Andrews, Cedar Brook, Williamstown Inc., Landisville (T), Hammonton (Bassett), Mays Landing, Manumuskin, Tuckahoe, Dennisville (OHB).

LEUCOTHOE D. Don.

Leucothoe racemosa (L.). Swamp *Leucothoe*.

Pl. C., Fig. 1.

Andromeda racemosa Linnæus, Sp. Pl. 394. 1753 [Pennsylvania].—Barton, Fl. Phila. 198. 1818.

Leucothoe racemosa Knieskern 20.—Willis 38.—Britton 160.—Keller and Brown 247.

Frequent in moist thickets throughout the coastal plain, except on the coast islands, where we have no records, also at several stations in the uplands of the northern counties.

The long one-sided racemes remind one of the *Chamædaphne*, but they are much less conspicuous, blooming when the leaves are well developed.

Fl.—Mid-May to late June. *Fr.*—Late September through autumn.

618 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—Farmingdale, Arney's Mt. (S), Delair, Fish House (S), Medford (S), Washington Park, Glassboro, Dividing Creek.

Pine Barrens.—Davenport, Brown's Mills, Forked River, Speedwell (S), Jackson, Cedar Brook, Malaga (P), Landisville, Hammonton (Bassett), Pan-coast (S).

Cape May.—Court House (S), Cold Spring (OHB).

PIERIS D. Don.

Pieris mariana (L.). Stagger-bush.

Andromeda mariana Linnæus, Sp. Pl. 393. 1753 [Virginia].—Barton, Fl.

Phila. 197. 1818.—Knieskern 20.—Willis 38.—Britton 247.

Pieris mariana Keller and Brown 247.

Common in sandy ground throughout the Coastal plain, although not noted south of Dennisville on the Cape May peninsula. Also at a few points in the uplands of the northern counties.

The flowers of this little bush are the largest and handsomest of any of the urn-shaped blooms so frequent among the Huckleberries and Ericaceous shrubs.

Their dense white masses form one of the attractive features of the sandy road—I will not say roadsides, for they grow quite as frequently in the middle—in June.

Fr.—Late May to late June. *Fr.*—Early September through autumn.

Middle District.—Matawan (NB), Farmingdale, New Egypt, Arney's Mt. (S), Pemberton (NB), Medford, Lawnside (S), Washington Park, Lindenwood (S), Mickleton, Mantua, Sewell (S), Glassboro (S), Dividing Creek.

Pine Barrens.—Pt. Pleasant, Davenport, Toms River (S), Brown's Mills, Forked River, Tuckerton, Manahawkin, East Plains, West Plains (S), Speedwell, Tabernacle, Bear Swamp (S), Albion, Williamstown Inc., Atco, Cedar Brook, Landisville, Hammonton (Bassett), Egg Harbor City, Mays Landing, Dennisville (S).

Coast Strip.—Holgate's (L), Spray Beach (L), Surf City (L), Peahala (L), Sherburn's (L), Beach Haven Crest (L).

XOLISMA Rafinesque.

Xolisma ligustrina (L.). Privet *Andromeda*.

Vaccinium ligustrina Linnæus, Sp. Pl. 351. 1753 [Pennsylvania].

Andromeda paniculata Barton, Fl. Phila. 198. 1818.

Andromeda ligustrina Knieskern 20.—Britton 161.

Xolisma ligustrina Keller and Brown 247.

Frequent throughout the State, usually in moist thickets; very common in the Pine Barrens.

While the flowers are the smallest of any of the *Andromeda*-like shrubs, they are sometimes born in such masses as to be

quite conspicuous. One specimen in my herbarium has an inflorescence measuring 25 cm. in length.

Fr.—Mid-June to early July. *Fr.*—Early September through autumn.

Middle District.—Shark River, Farmingdale, New Egypt, Hartford, Medford (S), Westville, Washington Park, Lawnside (S), Mickleton, Tomlin, Swedesboro, Yorktown, Dividing Creek.

Pine Barrens.—Pt. Pleasant (S), Forked River, Manahawkin, Speedwell, Applepie Hill, Bear Swamp, Albion, Andrews, Williamstown Jnc., Winslow (S), Hammonton (Bassett), Weekstown, Folsom, Tuckahoe (S).

Cape May.—Cape May.

EPIGÆA L.

Epigæa repens L. *Arbutus*.

Pl. XCVIII.

Epigæa repens Linnæus, Sp. Pl. 395 [Virginia and Canada].—Knieskern 20.
—Britton 160.

Found in dry sandy woods throughout the State; most abundant in the Pine Barrens and the mountains of the northern counties.

Arbutus seems out of place in the sandy stretches of the Pine Barrens, but, nevertheless, it grows here in luxuriance and with as fine flowers as I have ever seen in richer soil. Sometimes fire sweeps over its haunts and frequently the mid-summer sun curls up its leaves until the edges are brown and brittle, but still it persists and rivals the Pyxie and Helonias as the most attractive early spring flower of the region.

Fl.—Early April to early May. *Fr.*—July, probably.

Middle District.—Farmingdale, New Egypt, Bordentown, Birmingham, Fish House, Kirkwood, Glassboro, Swedesboro.

Pine Barrens.—Brown's Mills, Bamber, Woodmansie, Waretown, E. Plains (S), Bear Swamp (S), Hammonton (Bassett), Pleasant Mills, Mays Landing (S), Palermo, Petersburg (S).

Cape May.—Court House, Cold Spring (OHB).

CHAMÆDAPHNE Moench.

Chamædaphne calyculata (L.). *Leather-leaf*, *Cassandra*.

Pl. XCII., Fig. 1; Pl. C., Fig. 2.

Andromeda calyculata Linnæus, Sp. Pl. 394. 1753 [Virginia, Canada and Siberia].—Barton, Fl. Phila. 197. 1818.

Cassandra calyculata Knieskern 20.—Britton 160.

Chamædaphne calyculata Keller and Brown 247.

Swamps and edges of ponds and bogs. Most abundant in the Pine Barrens and parts of the northern counties, less common elsewhere and apparently absent from the coast and Cape May peninsula.

The small wet bogs of the Pine Barrens where shallow water is always standing and the borders of the large cranberry bogs are covered with a thick growth of this little shrub; the upper parts of the branches are covered with the small, dull green, often brown, leaves, while below is a wiry mass of stems and twigs.

In early spring, when the Shadbush and Red Maple are the only taller shrubs or trees to bloom, the Leather-leaf puts forth the one sided racemes of white cylindrical flowers, which have gained for it the name of "false teeth bush."

Fl.—Early April to early May, from buds of the previous season. *Fr.*—Early September through autumn.

Middle District.—Shark River, New Egypt, Berlin, Kaighns Pt., Six miles west Mickleton, Swedesboro.

Pine Barrens.—Toms River, Brown's Mills, Bamber, Forked River, West Creek, Cedar Bridge, High Bridge, Bear Swamp, Albion, Cedar Brook, Landisville (T), Buena Vista, Pleasant Mills (T), Winslow Jnc., Hammonton (P), Pancoast, Mays Landing (S), Dennisville (OHB).

GAULTHERIA L.

Gaultheria procumbens L. Wintergreen.

Pl. XCIII., Fig. 2; XCVII., Fig. 1.

Gaultheria procumbens Linnæus, Sp. Pl. 395. 1753 [Canada].—Barton, Fl. Phila. 194. 1818.—Knieskern 20.—Britton 160.

Woods and thickets; most abundant in the Pine Barrens and in the mountains of the northern counties.

The Wintergreen is a characteristic plant of the South Jersey woods, and the berries are often gathered and sold by the natives of the Pine Barrens.

Fl.—Late June to early August. *Fr.*—Late September into October, persisting over winter.

Middle District.—Shark River, New Egypt, Medford (S), Sicklerville (S), Braddock's Mill (S), Lindenwold, Swedesboro.

Pine Barrens.—Pt. Pleasant (S), Brown's Mills, Toms River (P), Forked River, Waretown, Pasadena, Cox's, Tuckerton, Manahawkin, E. Plains (S), Speedwell, Clementon (S), Cedar Brook, Winslow Jnc., Hammonton (Basett).

ARCTOSTAPHYLOS Adanson.

Arctostaphylos uva-ursi (L.). Bearberry, "Uvursy."

Pl. XCIX; Pl. C., Fig. 3.

Arbutus Uva-ursi Linnæus, Sp. Pl. 395. 1753 [Europe frig. and Canada].—Pursh, Fl. Am. Sept. I. 283. 1814.*Arctostaphylos Uva-ursi* Knieskern 20.—Willis 38.—Britton 159.—Saunders, Proc. Acad. Nat. Sci. Phila. 544.—Keller and Brown 248.

Reported from three localities on the Palisades and mountains of the northern counties and frequent in the central Pine Barrens.

This is one of the species most characteristic of the plains of the Pine Barrens, though it is not so closely restricted to this area of dwarf vegetation as is the *Corema*. Both are northern species of wind-swept coast and mountain top, which here find their southernmost limit.

Mr. C. F. Saunders says of it in this region: "In some places the Bearberry formed a veritable carpet, the dry, astringent berries not yet tinged with the crimson that makes them so conspicuous in winter. The gathering of this plant for shipment to the cities, where it has been more or less extensively employed in medicine, used to be a considerable industry in southern New Jersey. A reminiscence of this old-time trade still lingers in one of the common names of the plant down there, viz., *Uvursy*—the shop name of the berry being *uva-ursi*."

In early spring the plant is particularly attractive when we find among the dark, shining evergreen leaves the tiny little urn-shaped pink and white blossoms, like diminutive Huckleberry flowers, but far more delicate.

In mid-summer, on the white sandy wastes, the dense mats of foliage of the Bearberry offer welcome shelter to various grasshoppers, lizards, etc., which go scuttling away as their retreat is threatened.

Fl.—Late April to mid-May. *Fr.*—Early August into September, persisting through the winter into the following spring.

Pine Barrens.—Lakehurst, Davenport, Toms River, Whitings, Mt. Misery, Hanover, Bamber, Pasadena, Cedar Grove (S), Cedar Bridge, E. Plains, W. Plains, Speedwell (S), Chatsworth, Atsion (KB), Pleasant Mills, Batsto, Elwood (KB).

Family VACCINIACEÆ. Huckleberries, etc.

Key to the Species.

- a. Trailing vine, corolla, white tinged with pink, deeply four parted, with reflexed lobes. Berry large, crimson. *Oxycoccus*, p. 627
- aa. Erect shrubs.
 - b. Flowers open, campanulate, yellowish or purplish green, berry green or yellowish. *Polycodium*, p. 624
 - bb. Flowers cylindrical, bell-shaped.
 - c. Leaves entire.
 - d. Pale and glaucous beneath.
 - e. Berries in loose racemes, bracts foliaceous, deciduous flowers greenish pink. *Gaylussacia frondosa*, p. 623
 - ee. Berries in more compact racemes, bracts none.
 - f. Bushes 2-4 m. high.
 - g. Berries black, flowers pink, appearing before the leaves, leaves pubescent beneath. *Vaccinium atrococcum*, p. 626
 - gg. Berries blue, flowers white, appearing with the leaves, leaves nearly or quite glabrous. *V. corymbosum*, p. 624
 - ff. Bushes 1.5-8 dm. high, berries blue, leaves glabrous, flowers pink. *V. vacillans*, p. 627
 - dd. Leaves resinous dotted, green on both sides, racemes leafy, berries black.
 - e. Bracts inconspicuous, deciduous. *Gaylussacia baccata*, p. 624
 - ee. Bracts leaf-like, persistent, berries somewhat hispid. *G. dumosa*, p. 623
 - cc. Leaves serrate, small twigs green.
 - d. Leaves narrowly oval-oblong 25-65×12-25 mm.
 - e. Shrub 9-30 dm. high. *Vaccinium virgatum*, p. 625
 - ee. Shrub 1.5-8 dm. high. *V. vacillans*, p. 627
 - dd. Leaves acute at both ends, 18-36×6-12 mm., shrub 1.5-6 dm. high. *V. pennsylvanicum*, p. 626

Large quantities of huckleberries are gathered and shipped out of southern New Jersey every year. *Vaccinium corymbosum* yields the best berry, but it is not so plentiful as the lower species, and growing in the swamps is harder to get at. The bulk of the crop consists of *V. vacillans*, *Gaylussacia baccata* and *G. frondosa*. The somewhat hispid berries of *G. dumosa*—"Grouseberry" as it is locally called—do not seem to be marketable, while *Vaccinium pennsylvanicum*, such an abundant fruit bearer in the mountains, does not seem to develop full-sized fruit in this region, at least not in the lower part.

Gaylussacia baccata is probably the most abundant species, and is popularly known as "Hog huckleberry."

GAYLUSSACIA Humboldt, Bonpland & Kunth.

***Gaylussacia frondosa* (L.). Blue Huckleberry.**

Pl. CII., Fig. 1.

Vaccinium frondosum Linnæus, Sp. Pl. 351 1753 [N. America].—Barton, Fl. Phila. 196. 1818.

Vaccinium frondosum var. *lanceolatum* Pursh, I. 286. 1814 [N. J. to Carolina].

Gaylussacia frondosa Knieskern 20.—Britton 158.—Keller and Brown 248.

Dry woodland; frequent throughout but mainly on the coastal plain and most abundant in the Pine Barrens.

Fl.—Late May to late June. *Fr.*—Mid-July into September.

Middle District.—Farmingdale, Arney's Mt. (S), Fish House (S), Kaighns Swp., Medford (S), Repaupo, Tomlin (S), Sewell (S), Clementon, Sickler-ville, Glassboro, Dividing Creek (S).

Pine Barrens.—Pt. Pleasant (S), Toms River (S), Brown's Mills, Bamber, Forked River, Tuckerton, W. Plains, Speedwell, Chatsworth, Bear Swamp (S), Albion, Cedar Brook, Winslow (S), Mouth of Batsto, Egg Harbor City (S), Tuckahoe (S).

Coast Strip.—Brant Beach (L), Surf City (L), Spray Beach (L), Beach Haven (L), Holgate's (L).

Cape May.—Court House (S), Cape May.

***Gaylussacia dumosa* (Andr.)* Leafy-bracted Huckleberry.**

Pl. CII., Fig. 3.

Vaccinium dumosum Andrews, Bot. Rep. II. pl. 112. 1799 [North America].—Barton, Fl. Phila. 195. 1818.—Pursh, Fl. Am. Sept. I. 285. 1814.

Gaylussacia dumosa Knieskern 20.—Britton 158.—Keller and Brown 248.

Plentiful throughout the Pine Barrens and locally in the Middle and Cape May districts, in open sandy swamps.

Fl.—Late May to late June. *Fr.*—Late July into September.

Middle District.—Shark R., Squan (NB), Farmingdale, Burlington, Kaighns Pt., Griffith's Swp., Kirkwood, Sewell (S), Swedesboro, Dividing Creek.

Pine Barrens.—Manchester, Lakehurst, Davenport, Bamber, Forked River, Mayetta, E. Plains, Speedwell, Bear Swamp, Clementon, Albion, Jackson, Atco, Andrews, Williamstown Jnc., Cedar Brook, Landisville (T), Winslow (S), Hammonton, Quaker Bridge, Egg Harbor City, Folsom, Twelfth St. (T), Mays Landing, Woodbine, Tuckahoe (S).

Cape May.—Dias Creek (S).

* I fail to distinguish the variety *bigeloviana*, proposed by Prof. Fernald, cf. *Rhodora* 1911, 99.

Gaylussacia baccata Wang.† **Black Huckleberry.**

Pl. CII., Fig. 2.

Vaccinium baccatum Wangenheim, Brit. Am. 30, pl. 39, f. 69. 1787 [New York].*Vaccinium resinolum* Barton, Fl. Phila. 196. 1818.*Gaylussacia resinosa* Knieskern 20.—Britton 158.

Dry woodland; common throughout the State.

Fl.—Early May to early June. *Fr.*—Early July into August*Middle District.*—Farmingdale, Arneys Mt. (S), Merchantville, Medford (S), Clementon (S), Sicklerville (S), Swedesboro.*Pine Barrens.*—Toms River, Brown's Mills, New Lisbon, Bamber, Waretown, E. Plains, W. Plains, Speedwell, Cedar Brook, Landisville (T), Winslow (S), Atsion (NB), Head of Batsto, Pleasant Mills (NB), Tuckahoe (S).*Coast Strip.*—Surf City (L), Ship Bottom (L), Beach Haven Crest (L), Piermont (S).*Cape May.*—Court House (S).**POLYCODIUM Rafinesque.*****Polycodium stamineum* (L.). Deerberry.***Vaccinium stamineum* Linnæus, Sp. Pl. 350. 1753 [North America].—Barton, Fl. Phila. 195. 1818.—Knieskern 20.—Britton 158.? *Vaccinium album* Pursh, Fl. Am. Sept. I. 285. 1814 [New Jersey to] Carolina.]

Frequent in woodlands of the northern counties and rare southward in the Middle district only.

Fl.—Mid-May to early June. *Fr.*—Early September through autumn.*Middle District.*—Bordentown, Washington Park, Mickleton, Delair.**VACCINIUM L.*****Vaccinium corymbosum* L. Tall Blueberry.**

Pl. CI., Fig. 1.

Vaccinium corymbosum Linnæus, Sp. Pl. 350. 1753 [North America].—Barton, Fl. Phila. 196. 1818.—Knieskern 20.—Britton 149.

Frequent in swampy thickets throughout the State.

Fl.—Early May to late May, appearing when the leaves are partly expanded. *Fr.*—Early July to early August, sporadically through the latter month.This is the most frequent tall blueberry. It varies a good deal in the size of flowers and fruit and in leaf characters. These variations are discussed under *V. cæsariense* below.

† cf. Mackenzie Torrey 1907: 60.

Middle District.—Farmingdale, Bordentown, New Egypt, Kaighns Pt., Pensauken (S), Washington Park, Westville, Mickleton, Mantua, Sicklerville (S), Swedesboro, Union Grove (S), Quinton, Beaver Dam.

Pine Barrens.—Toms River (S), Forked River, Manahawkin, Speedwell, Harris, Penbryn (S), Head of Batsto, Cedar Brook, Landisville (T), Weekstown, Egg Harbor City, Dennis (S).

Coast Strip.—Ocean City (S), Piermont (S), Surf City (L), Spray Beach (L).

***Vaccinium virgatum* Ait. Southern Black Blueberry.**

Vaccinium virgatum Aiton, Hort. Kew. II. 12. 1789 [North America].—Mackenzie, Torrey VII. 144.

Pine Barrens; rather local.

Fl. and *Fr.*.—Apparently similar to *V. corymbosum*.

Pine Barrens.—New Lisbon, Farmingdale, Pt. Pleasant, Speedwell, Chatsworth, Lakehurst (Mackenzie).

***Vaccinium cæsariense* Mackenzie. New Jersey Blueberry.**

Vaccinium cæsariense Mackenzie, Torrey 1910. 230 [Toms River].

Frequent in the Pine Barrens.

Fl. and *Fr.*.—Apparently similar to *V. corymbosum*.

Middle District.—Woodbury.

Pine Barrens.—Pleasant Mills.

Coast Strip.—Five-Mile Beach.

There seem to be, as stated by Mr. Mackenzie, three forms of tall Blueberry in the New Jersey coastal plain. Material is not available for a satisfactory study of the flowers as compared with the tall Blueberries of eastern Pennsylvania or northern New Jersey, but considering leaves only we have within our limits, (1) a form with finely serrate leaves (*virgatum*) somewhat pubescent below, apparently restricted to the Pine Barrens in southern New Jersey, although some specimens from the Cape May peninsula are intermediate between this and the next, the serration being obscure, but clearly present; (2) a form with entire leaves somewhat pubescent below, particularly on the veins (*corymbosum*) and (3) an entire leaved absolutely glabrous form (*cæsariense*).

The last two occur also on the Alleghenies of Sullivan and Wyoming Counties, Pennsylvania, and doubtless elsewhere in the intervening country, while a serrate-leaved very pubescent plant was found by Mr. E. B. Bartram, at Bangor, Northampton Co., Penna.

V. corymbosum is admittedly wide ranging, and the evidence is suggestive that the other forms are to be found materially north of the New Jersey coastal plain, unless it be found that the more northern specimens have distinctive floral characters. If not, it seems possible that some older names may have to be considered in straightening out the nomenclature of the group. Provisionally, however, the New Jersey plants had better be named in accordance with Mr. Mackenzie's conclusions.

***Vaccinium atrococcum* (Gray). Black Blueberry.**

Vaccinium corymbosum var. *atrococcum* Gray, Man. Ed. V. 292. 1867.
[Eastern North America].

Vaccinium disomorphum Britton 159.

Vaccinium atrococcum Keller and Brown 249.

Moist thickets throughout our region and also northward in Bergen and Hudson Counties.

Fl.—Late April to mid-May, appearing before or with the leaves. *Fr.*—Late June to late July, sporadically into August.

Middle District.—Farmingdale, Burlington (C), Pemberton (NB), Washington Park, Woodbury, Mickleton, Palatine, Alloway, Union Grove (S).*

Pine Barrens.—Forked River (C), Toms River (S), Mayetta, Chatsworth, Winslow (S), Egg Harbor City.

Coast Strip.—Surf City (L), Peahala (L), Beach Haven Terrace (L), Spray Beach (L).

Cape May.—South Dennis, Court House (S), Cold Spring.

***Vaccinium pennsylvanicum* Lam. Narrow-leaved Dwarf Blueberry.**

Pl. CI., Fig. 2.

Vaccinium pennsylvanicum Lamarck, Encycl. I. 74. 1783 [Pennsylvania].—
—Knieskern 20.—Britton 159.—Keller and Brown 249.

Vaccinium tenellum Barton, Fl. Phila. 197. 1818.

Frequent in the northern counties and northeastern part of the Middle district, less common in the southern part, generally near the edge of the Pine Barrens, but very rare in that region itself.

Fl.—Late April to mid-May, appearing with the leaves. *Fr.*—Late June to late July, rarely slightly later.

* Swedesboro (KB) = *V. vacillans*.

Middle District.—Shark River, Farmingdale, Bordentown, Kirkwood, Pensauken (S), Arneys Mt. (S), Pemberton (C), New Lisbon, Brown's Mills, Fish House (S), Haddonfield (KB), Taunton, Westville (KB), Ballingers Mill, Lindenwold, Fairview (H), Atco (C), Clementon, Swedesboro (CDL), Elsinboro (C), Millville (KB).

Pine Barrens.—Bamber.*

***Vaccinium vaccillans* "Kalm," Torrey. Low Blueberry.**

Pl. CI., Fig. 3.

Vaccinium vaccillans "Kalm," Torrey Fl. N. Y. I. 44. 1843 [near New York].—Britton 159.

Dry woods; common throughout the State.

Fl.—Early May to late May, when the leaves are partly expanded. *Fr.*—Late June to late July, rarely slightly later.

Middle District.—Farmingdale, Bordentown, Pensauken (S), Arney's Mt., Delaire, Fish House (S), Medford (S), Woodbury Hts., Sicklerville (S).

Pine Barrens.—Davenport, Toms River, Bamber, Forked River, E. Plains, W. Plains, Speedwell, Clementon, Cedar Brook, Tuckahoe, Somers Pt. (NB).

Coast Strip.—Five-Mile Beach.

Cape May.—Court House (S).

OXYCOCCUS Hill.

***Oxycoccus macrocarpus* (Ait.). Cranberry.†**

Pl. XCVII., Fig. 2.

Vaccinium macrocarpon Aiton, Hort. Kew. II. 13 pl. 7. 1789 [North America].

Oxycoccus macrocarpus Barton, Fl. Phila. 184. 1818.—Britton 158.—Keller and Brown 250.

Vaccinium Oxycoccus Knieskern 20.

Locally in Bergen, Essex and Hudson Counties and plentiful in the bogs of the Pine Barrens; rarely in the Middle and Cape May districts.

The cultivation of the Cranberry is to-day the principal industry of the Pine Barrens, and every year acres of natural bog,

* The Hammonton record (KB) has not been verified, and is, I think, very doubtful.

† Cf. Wm. Saunders, *Cranberry Culture*, U. S. Dept. Agr., Farmers' Bulletin 13. 1894. J. B. Smith, *Insects Injurious in Cranberry Culture*, U. S. Dept. Agr., Farmers' Bulletin 178. 1903. C. L. Shear, *Cranberry Diseases*, U. S. Dept. Agr., Bulletin 110, Bureau Plant Industry. 1907.

Prof. Willis in his catalogue, p. 37, states that *Vaccinium oxycoccus* occurs in Ocean and Monmouth counties, but that it is rapidly being supplanted by the larger *V. macrocarpon*. I find no other evidence, and think that the smaller cranberry to which he referred was merely the wild native form of *O. macrocarpus*.

open savanna land or cleared cedar swamp are converted into cultivated bog. The usual procedure is to construct a dyke or dam across the stream which waters the tract and along the sides of the area also wherever the natural slope of the land is not sufficient to serve as a barrier; ditches are then cut through at intervals and the vines are planted. In the late autumn or early winter the floodgates are put down and the green bog becomes a spacious lake.* Early in May the water is drawn off and after about two weeks the bog is again flooded for a few days to drown out certain insect pests which devour the vines. The bogs occasionally require to be sanded to lighten the soil and produce better growth. This is done in winter by spreading the sand over the ice, which when it melts, of course, deposits the sand evenly over the bog.

By September first the picking begins. Some of it is done by hand, but much of it by scoops provided with long slender fingers, which, drawn lengthwise along the vines, pull the berries off into the hollow of the scoop. The berries that are scattered or lost from the scoops are often secured by flooding the bogs again, when they rise to the surface and can be scooped up wherever they collect. The picking ends about the middle of October and then the bogs are raked so as to draw all the vines in one direction to aid the gathering of the next crop. Several different types of berry have originated as the result of cultivation, a large ovoid one, the "Howell"; a more spherical berry, the ordinary Jersey form, and a smaller, darker one, the "Cape Cod." All are mere forms of *O. macrocarpus*.

The picking was in old times done by the natives, but for some years past it has been almost entirely done by Italians, who are brought down from Philadelphia and other neighboring cities in large numbers, accompanied by their wives and families, all of whom aid in the work. Their camps, with blazing fires and music at night, are quite picturesque, offset as they are by the darkness of the surrounding forest and cedar swamps.

Fl.—Mid-June to mid-July. *Fr.*—Late August to mid-September, persisting over winter.

* See Pl. CXXIX.

Middle District.—Farmingdale, New Egypt, Burlington, Washington Park, Mickleton, Clementon (S), Centerton (S), Union Grove (S), Swedesboro, Repaupo (CDL), Beaver Dam.

Beaver Dam.

Pine Barrens.—Pt. Pleasant, Davenport, Toms River, Hanover, Brown's Mills, Forked River, Bear Swamp (S), Kenilworth (S), Speedwell, Balingier's Mill, Albion, Andrews, Cedar Brook, Landisville (T), Inskip, Hammonton, Egg Harbor City, Folsom, Absecon, Palermo.

Coast Strip.—Barnegat City (L), Surf City (L), Spray Beach (L), Beach Haven (L), Holgate's (L), Seaside Park (S).

Cape May.—Dias Creek (S).

Family DIAPENSIACEÆ. *Diapensia*, etc.

PYXIDANTHERA Michaux.

Pyxidanthera barbulata Michx. *Pyxie*.

Pl. XXXIV., Fig. 1.

Pyxidanthera barbulata Michaux, Fl. Bor. Am. I. 152 pl. 17. 1803 [Upper Carolina].—Knieskern 24.—Willis 48.—Britton 164.—Keller and Brown 250.

Diapensia cuneifolia Pursh, Fl. Am. Sept. I. 148. 1814.

Plentiful in the white sand of the Pine Barrens, also at several localities in Middlesex County and one in Camden County in the Middle district.

The *Pyxie* to some extent takes the place of the *Hepatica* in the Pine Barrens as one of the emblems of spring. Certainly there are few more attractive sights in the still brown woods than its white starry blossoms looking forth from their green moss-like setting and often partly covered by dead strands of grass or withered leaves which have covered them during the winter. The *Pyxie* seems to grow both in dry and moist situations, but always in sand, sometimes forming patches a foot in diameter, with little sprays trailing off from the main colony each lined with the little round petaled flowers.

Fl.—Early April to early May.

Middle District.—Griffith's Swamp.

Pine Barrens.—Shark River (P), Brindletown, Toms River (NB), Brown's Mills, Bamber, Woodmansie, Forked River, Waretown, Manchester (NB), Cedar Bridge, E. Plains, Bear Swamp, Clementon, Sumner, Jackson, Cedar Brook, Waterford (P), Landisville, Millville, Hammonton, Pleasant Mills, Egg Harbor City, Mays Landing (S), Belleplain (OHB).

Order PRIMULALES.

Family PRIMULACEÆ. Primroses, etc.

Key to the Species.

- a. Plants of ponds or marshes, with inconspicuous flowers.
 - b. Aquatic herb, with crowded submersed pinnate leaves and a thick emersed spike of small flowers. *Hottonia*, p. 630
 - bb. Small, prostrate, maritime herbs with opposite fleshy leaves and minute axillary flowers. *Glaur*, p. 633
- aa. Plants of swamps or dry ground, flowers conspicuous.
 - b. Flowers white.
 - c. Not over 2 mm. broad in an elongated terminal raceme; leaves alternate, obovate, obtuse 20-80 mm. long. *Samolus*, p. 631
 - cc. Flowers 8-12 mm. broad, few or solitary, leaves lanceolate or oblong lanceolate, clustered in a whorl at the top of the stem. *Trientalis*, p. 633
 - bb. Flowers yellow.
 - c. Plant trailing, flowers axillary, solitary. [*Lysimachia nummularia*]¹
 - cc. Plant erect.
 - d. Leaves verticillate. *L. quadrifolia*, p. 631
 - dd. Leaves opposite.
 - e. Flowers not over 10 mm. broad, in a terminal raceme.
 - f. Raceme leafy only at the base. *L. terrestris*, p. 631
 - ff. Raceme leafy to the middle. *L. producta*, p. 632
 - ee. Flowers 10-25 mm. broad, axillary and slender peduncled.
 - f. Petioles strongly ciliate, plant 3-12 dm. high. *Steironema ciliata*, p. 632
 - ff. Petioles not ciliate, plant 1.5-9 dm. high. *S. lanceolata*, p. 632
 - bbb. Flowers scarlet, axillary, 4-6 mm. broad, leaves opposite, black dotted below. [*Anagallis arvensis*]²

HOTTONIA L.

Hottonia inflata Ell. Featherfoil.

Hottonia inflata Elliott, Bot. S. C. and Ga. I: 231. 1817 [Millidgeville, Ga.].—Britton 164.—Keller and Brown 250.

In ponds, etc., rare; several localities in Bergen County; two in the Middle and one in the Cape May district.

Fl.—May and June specimens show flower, mature capsules and buds.

¹ Money-wort, "Wandering Jew," a bad weed in lawns.

² Scarlet Pimpernel, a weed in waste ground.

Middle District.—Eatontown (C), Riddleton.
Cape May.—Green Creek (OHB).

SAMOLUS L.

Samolus floribundus H.B.K. Water Pimpernel.

Samolus floribundus Humboldt, Bonpland and Kunth, Nov. Gen. II. 224.
 1818 [near Callao, Peru].—Keller and Brown 250.
Samolus Valerandi var. *floribundus* Britton 166.
Samolus Valerandi Nuttall, Gen. I. 121. 1818.
Samolus Valerandi var. *Americanus* Knieskern 22.—Willis 41.

Common along the edges of the Maritime marshes of the coast, also in the Middle district; at two localities in Burlington County and two in Hunterdon County.

Fl.—Late May into October.

Middle District.—Rancocas Creek, Medford (S).

Coast Strip.—Sea Bright, Long Branch, Pt. Pleasant, Seaside Park, Forked River, Spray Beach (L), Beach Haven Terrace (L), Ship Bottom (L), Absecon (S), Atlantic City, Palermo (S), Piermont, Wildwood, Holly Beach, Cold Spring (S), Cape May.

Also a specimen in Bassett's herbarium, from Hammonton, which I regard as of coastal origin; see p. 800.

LYSIMACHIA L.

Lysimachia quadrifolia L. Whorled Loosestrife.

Lysimachia quadrifolia Linnæus, Sp. Pl. 147. 1753 [Virginia].—Knieskern 21.—Britton 165.

Open woods, clearings, etc.; frequent in the Northern and Middle districts. Occasional in the Coast strip and Cape May peninsula; also in the Pine Barrens, where it is apparently introduced.

Fl.—Early June to late June.

Middle District.—Farmingdale, New Egypt, Medford (S), Washington Park, Lindenwold (S), Mickleton, Swedesboro, Yorktown, Dividing Creek.
Pine Barrens.—Landisville, Winslow Jnc., Hammonton (Bassett).

Coast Strip.—Cox's.

Cape May.—Cold Spring (OHB).

Lysimachia terrestris (L.). Bulb-bearing Loosestrife.

Viscum terrestris Linnæus, Sp. Pl. 1023. 1753 [Philadelphia].—Britton 165.
Lysimachia stricta Knieskern 21.
Lysimachia racemosa Barton, Fl. Phila. 104. 1818.

Low swampy ground; frequent throughout the State. A common species in the Pine Barrens, where the preceding is

absent or practically so. The supposed hybrid, *L. producta* (Gray), has been collected at Burlington by S. W. Conrad.

Curious little jointed bulblets grow out from the axils of the leaves in late summer producing an appearance quite different from that presented at the flowering season. Specimens in this condition were mistaken by Linnæus for a terrestrial Mistletoe, which accounts for the plant being originally described in the genus *Viscum*.

Fl.—Mid-June to early July.

Middle District.—Farmingdale, New Egypt, Hartford, Pemberton Jnc. (S), Kaighns Pt., Washington Park, Lindenwold (S), Mickleton.

Pine Barrens.—Toms River, Forked River, Bear Swamp, Clementon, Jackson, Albion, Landisville (T), Atsion, Hammonton (Bassett), Folsom, Palermo.

Coast Strip.—Surf City (L), Spray Beach (L), Ship Bottom (L).

Cape May.—Cold Spring (S).

STEIRONEMA Rafinesque.

Steironema ciliatum (L.). **Fringed Loosestrife.**

Lysimachia ciliata Linnæus, Sp. Pl. 147. 1753 [Virginia and Canada].—

Barton Fl. Phila. 105. 1818.—Knieskern 22.—Willis 41.

Steironema ciliatum Britton 165.

Edges of low woods and thickets; frequent in the Northern and upper Middle districts.

Fl.—Mid-June to late July.

Middle District.—Farmingdale, New Egypt, Delair, Camden, Oaklyn (S), Washington Park, Swedesboro.

Steironema lanceolatum (Walt.). **Lance-leaved Loosestrife.**

Lysimachia lanceolata Walter, Fl. Car. 92. 1788 [Carolina].

Steironema lanceolatum Britton 165.—Keller and Brown 251.

?*Lysimachia angustifolia* Barton, Fl. Phila. 105. 1818.

Low grounds of the northern counties and rarely southward in the Middle district.

This is one of the species that extend southward along the Delaware River, seldom occurring far from its shores.

Fl.—Early July to mid-August.

Middle District.—Florence, Delanco, Washington Park (KB), between Camden and Glassboro, Swedesboro (CDL), Mickleton.

Also a specimen from Main Road Station in the Pine Barren region, collected by C. A. Gross, and, like many other plants from the same vicinity, obviously introduced.

TRIENTALIS L.

Trientalis borealis Raf. Star Flower.

Trientalis borealis Rafinesque, N. Y. Med. Repos. 354 [New England and Canada]. New name for "*T. europæa*, American form" of Michaux [New England and Canada].

Trientalis americana Knieskern 21.—Britton 165.—Keller and Brown 251.

Generally distributed in woodland throughout the State, but apparently most plentiful in the northern counties and along the coast.

Fl.—Early May to early June.

Middle District.—Farmingdale, Pemberton (C), Moorestown (NB), Camden (P), Gloucester (C), Woodbury, Mickleton, Clementon (KB), Quinton (C), Bucksbutem.

Pine Barrens.—Davenport, Toms River (NB), Ancora (KB), Vineland (C), Hammonon (C), Pleasant Mills, Mouth of Batsto, Mays Landing, Manumuskine (S), Absecon (S).

Coast Strip.—Deal (KB), Ocean Grove (H), Bay Head, Pt. Pleasant, Surf City (L), Spray Beach (L), Cox's, Manahawkin, West Creek, Atlantic City (P), Piermont (S), Anglesea, Wildwood.

Cape May.—South Dennis, Goshen (S), Bennett, Cold Spring.

GLAUX L.

Glaux maritima L. Sea Milkwort.

Glaux maritima Linnæus, Sp. Pl. 207. 1753 [Europe].—Britton 166.

This plant was collected many years ago at Deal Beach by the late Aubrey H. Smith. Dr. Britton regarded it as "a fugitive from further north," but as it has been found in abundance at Chestertown, Maryland, by Mr. E. G. Vanatta, there seems no reason why we should regard the plant as other than a native of our coast. There are specimens in the Philadelphia herbarium from Deal, but it has not been found elsewhere in the State.

Coast Strip.—Deal—August—fresh flowers.

Family PLUMBAGINACEÆ. Sea Lavender, etc.

LIMONIUM Adanson.

Limonium carolinianum (Walt.). Sea Lavender.

Statice carolinianum Walter, Fl. Car. 118. 1788 [Carolina].—Pursh. Fl. Am. Sept. I. 212. 1814.—Willis 40.

Statice Limonium Knieskern 21.—Willis 40.

Statice Limonium var. *Carolinianum* Britton 164.

Limonium Carolinianum Keller and Brown 252.

Frequent on the salt marshes of the coast and lower Delaware bay.

Fl.—Late July into September.

Coast Strip.—Sandy Hook, Shark River, Manasquan, Pt. Pleasant, Forked River, Barnegat Pier, Spray Beach (L), Barrel Island (L), Tuckerton, Absecon (Bassett), Atlantic City, Ocean City, Avalon, Stone Harbor (S), Anglesea, Wildwood, Cold Springs (S), Cape May.

Order EBENALES.

Family EBENACEÆ. Ebony, Persimmon, etc.

DIOSPYROS L.

Diospyros virginiana L. Persimmon.

Diospyros virginiana Linnæus, Sp. Pl. 1057. 1753 [North America].—Barton, Fl. Phila. II. 198. 1818.—Knieskern 21.—Britton 166.

Common in fields and thickets of the Middle and Coast districts south to Cape May; casual north of the fall line in the northern counties—Morris, Hunterdon, Somerset, Essex, Union, Hudson—but apparently absent from the Pine Barrens, except along the edges.

The Persimmon is one of the typical Carolinian trees which give to the low woods of western New Jersey their austral tone. Its distribution is identical with that of the Opossum, which likes so well to feed upon the ripe fruit and, also, it has always seemed to me, of the country darkey and his little cabin, the type of darkey whose name is so closely associated with both 'Possum and 'Simmons in the folk lore of the south. All three may be found in Chester and Delaware Counties in Pennsylvania, but no farther back than the true Carolinian fauna and flora extend.

There is quite a difference in the fruit of different trees, some bearing decidedly ovoid fruit, while on others it is merely globular. As the leaves fall in mid-October the Persimmons become quite conspicuous, hanging tightly on the branches, their bright, russet-red coats shining in the sun; but their proper flavor is not acquired and the astringency modified until they are touched by frost and their skin somewhat wrinkled and turned purple; and those that are picked up from among the frost-covered leaves in late November or December are perhaps the best of all.

Fl.—Mid-June to late June. *Fr.*—October and November, after frost.

Middle District.—Farmingdale, New Egypt, Camden, Gloucester (P), Westville (P), Medford (S), Washington Park, Bridgeport, Swedesboro, Yorktown (S), Albion, Andrews, Williamstown Jnc.

Coast Strip.—Toms River (Mick.), Forked River, Holgate's (I.), Staffordville, Atlantic City (S), Mays Landing (S), Ocean City (S), Piermont (S), Cold Spring (S), Cape May Ct. House.

Cape May.—Bennett.

Order GENTIANALES.

Family OLEACEÆ. Olive, Ash, etc.

Key to the Species.

- a. Flowers with slender, long lobed, white flowers, forming fringe-like panicles; leaves opposite entire, fruit a blue drupe. *Chionanthus*, p. 636
- aa. Flowers small, green, leaves pinnate, fruit a winged seed (samara).
 - b. Lateral leaflets with short petioles.
 - c. Wing of fruit almost entirely terminal, not developed on the sides of the seed. *Fraxinus americana*, p. 635
 - cc. Wing beginning at the base of the seed and continued along its sides, widening gradually.
 - d. Branches, petioles and sometimes the under surface of the leaves pubescent.
 - e. Samara narrowly spatulate, leaves thin serrate. *F. pennsylvanica*, p. 635
 - ee. Samara broadly spatulate, leaves thick entire. *F. michauxi*, p. 636
 - dd. Branches, etc., glabrous, leaves bright green, both sides. *F. p. lanceolata*, p. 636
 - bb. Lateral leaflets sessile. *F. nigra*, p. 636

FRAXINUS L.

Fraxinus americana L. White Ash.

Fraxinus americana Linnæus, Sp. Pl. 1057. 1753 [Carolina and Virginia].—Britton 167.

Rich woods of the northern counties; rare southward within our limits and in the Middle district only.

Fl.—Early May to mid-May. *Fr.*—Early Autumn.

Middle District.—Arney's Mt. (S), Camden (P), Mickleton (P), Atco (C), Yorktown (S).

Fraxinus pennsylvanica Marsh. Red Ash.

Fraxinus pennsylvanica Marshall, Arb. Am. 51. 1785 [probably Pennsylvania].

Fraxinus pubescens Britton 167.

Common in low woods of the northern counties; much less common in the Middle district and rare in the Cape May peninsula.

Fl.—Early May to mid-May. *Fr.*—Early Autumn.

Middle District.—Farmingdale, New Egypt, Birmingham, Delair, Oaklyn (S), Washington Park, Lawnside (S), Pennsgrove (C).

Cape May.—Cold Spring (OHB), Court House.

***Fraxinus pennsylvanica lanceolata* (Borkh.). Green Ash.**

Fraxinus lanceolata Borkhausen, Handl. Forst. Bot. I. 826. 1800 [North America].—Keller and Brown 253.

Fraxinus viridis Knieskern 25.—Britton 167.

Distribution as in the preceding.

Fl. and Fr.—Similar to the last.

Middle District.—Monmouth and Ocean Co. (Knieskern), Center Square (H), Mullica Hill (H).

Cape May.—Goshen (S).

***Fraxinus michauxi* Britton.**

Fraxinus Michauxi Britton Manual, 1085. 1907 [Bronx Park, N. Y. City].

Rare and found only in the Middle district.

Fl. and Fr.—Probably as in *F. pennsylvanica*.

Middle District.—Swedesboro, Three miles northeast Mickleton.

***Fraxinus nigra* Marsh. Black Ash.**

Fraxinus nigra Marshall, Arb. Am. 51. 1785 [probably Pennsylvania].—Keller and Brown 254.

Fraxinus sambucifolia Willis 50.—Britton 167.

Wet woods of the northern counties and reported from Freehold (Willis in Britton's Catalogue), while at Swedesboro a few trees of this species were discovered by Mr. Chas. D. Lippincott.

Middle District.—Freehold (C), Swedesboro (CDL).

CHIONANTHUS L.

***Chionanthus virginica* L. Fringe Tree.**

Chionanthus virginica Linnæus, Sp. Pl. 8. 1753 [North America].—Nutt. Gen. I. 5. 1818.—Willis 50.—Britton 167.—Keller and Brown 254.

Chionanthus virginicus maritimus Pursh, Fl. Am. Sept. I. 8. 1814 [Sea coast and boggy woods, N. J.—Carolina].

Found only in low woods along the lower part of the Maurice River and Cohansey Creek and up the tributaries of the former

to Buena Vista. Nuttall's reference to a thirty-foot tree at "Port Elizabeth [Z. Collins]" probably refers to the village of that name below Millville in Cumberland County and not to Elizabeth in Union County, as given in Britton's Catalogue.

It is stated by Willis to grow at Camden, according to Canby, but I suspect this may have been an escape.

This is one of a group of species which push northward along the Susquehanna Valley and again along the lower Delaware, in each case following the arms of the Carolinian life zone, but checked in their eastern extension in New Jersey by the arid stretches of the Pine Barrens, which are quite unsuited to their needs.

Fl.—Late May to early June. *Fr.*—Early autumn.

Middle District.—Above Swedesboro, Bridgeton (C), Port Elizabeth (C), Buckshutem, Below Millville, Buena Vista (T), Near Landisville (probably same location), Bradway (Bassett).

Family GENTIANACEÆ. Gentians, etc.

Key to the Species.

- a. Leaves reduced to scales, plants 1-3 dm. high.
 - b. Sepals 2, flowers purplish, 8-12 mm. long. *Obolaria*, p. 643
 - bb. Sepals 4, flowers greenish yellow, 2mm. long.
 - c. Lobes of the corolla blunt and usually denticulate, plant generally strict and erect. *Bartonia virginica*, p. 643
 - cc. Lobes of the corolla acute and entire, plant generally flexuous and paniculately branched, but sometimes strict. *B. paniculata*, p. 642
- aa. Leaves normal, plants 3-10 dm. high.
 - b. Corolla blue, flowers 3-5 cm. long.
 - c. Margin of petals fringed. *Gentiana crinita*, p. 641
 - cc. Petals not fringed.
 - d. Leaves linear, mouth of corolla flaring open. *G. porphyrio*, p. 640
 - dd. Leaves ovate to lanceolate, corolla constricted at the mouth, sometimes nearly closed.
 - e. Corolla lobes distinct, equal to or exceeding the intervening plaits. *G. saponaria*, p. 642
 - ee. No perceptible lobes between the plaits. *B. andrewsii*, p. 641

* In Britton's Manual *Spigelia marylandica* L. is given as occurring in New Jersey, "according to Gray." The new Gray's Manual ignores this reference and restricts the plant to west of the Alleghenies, which, I have no doubt, is correct. If it ever did occur in New Jersey it must have been an introduction.

bb. Corolla pink.

c. Salverform 6-8 mm. broad.

[*Erythraea pulchella*]*

cc. Rotate 15-40 mm. broad.

d. Four to five parted.

e. Branches opposite.

Sabatia angularis, p. 638

ee. Branches alternate.

f. Calyx lobes shorter than the corolla. *S. stellaris*, p. 639

ff. Calyx lobes equal to the corolla. *S. gracilis*, p. 639

dd. Eight to twelve parted. *S. dodecandra*, p. 640

bbb. Corolla white.

c. Flowers oblong, funnel-form, striped within; in a sessile cluster.

Gentiana villosa, p. 641

cc. Flowers rotate in bracteolate cymes.

d. Branches opposite.

Sabatia lanceolata, p. 638

dd. Branches alternate, white forms of.

S. stellaris, p. 639

SABATIA Adanson.

Sabatia lanceolata (Walt.). Lance-leaved Centaury.

Chironia lanceolata Walter, Fl. Car. 95. 1788 [Carolina].

Sabbatia lanceolata Knieskern 24.—Willis 49.—Britton 171.—Keller and Brown 255.

Common in bogs and swamps of the Pine Barrens and similar situations at two or three stations in the Cape May peninsula.

A conspicuous species in mid-summer.

Fl.—Early July to late August.

Pine Barrens.—Cassville, Toms River, Hanover, Browns Mills, Pasadena, Double Trouble, Tuckerton, Speedwell (S), High Bridge (S), Bear Swamp (S), Ballingers Mill, Braddock's Mill, Cedar Brook, Atsion, Hammonton (S), Quaker Bridge, Batsto, Pleasant Mills, Egg Harbor, Hospitality Bridge 8th St. and 12th St., Mays Landing, Woodbine.

Cape May.—Bennett (S).

Sabatia angularis (L.). Square-stemmed Centaury.

Pl. CVI., Fig. 1.

Chironia angularis Linnæus, Sp. Pl. 190. 1753 [Virginia].

Sabbatia angularis Barton Fl. Phila. 113. 1818.—Willis 49.—Britton 171.

Rather frequent in open ground of the northern counties and down the Coast strip to Cape May; also occasional in the Middle district.

Fl.—Late July to late August.

Middle District.—Keyport (C), New Egypt, Burlington (C), Lindenwold, Sea Breeze (C).

Coast Strip.—Absecon (NB), Palermo (S), Wildwood, Wildwood Inc., Rio Grande, Court House, Whitesboro (S), Cold Spring, Cape May, W. Cape May, Dias Creek.

* Branching Centaury, introduced as a weed.

***Sabatia stellaris* Pursh. Sea Pink.**

Pl. CVI., Fig. 3.

Sabbatia stellaris Pursh, Fl. Am. Sept. I. 137. 1814 [Salt marshes of New York, New Jersey, etc.].—Knieskern 25.—Willis 49.—Britton 171.—Keller and Brown 255.

Abundant on the salt marshes of the coast and lower Delaware Bay and up the large tidewater streams.

This is one of the most abundant and characteristic flowering plants of the salt meadows, and its starry pink blooms with their yellow eye do much to produce that great profusion of color which marks the edge of the marshes toward the end of summer. Their stems and leaves are somewhat inconspicuous, and it sometimes looks as if the pink stars might have been scattered broadcast over the low coarse grass and rushes of the meadows. White flowered plants occur occasionally and starved dwarf individuals are sometimes found.

Fl.—Late July to early September.

Maritime.—Long Branch, Pt. Pleasant, Barnegat Pier, Spray Beach (L), Sherburn's (L), West Creek (S), Brigantine, Atlantic City, Crowleystown, Ocean City (S), Sea Isle City (S), Stone Harbor, Clermont, Wildwood, Anglesea, Bennett, Cape May, Green Creek, Dennisville, Beaver Dam.

Introduced at Batsto and Main Road Sta.

***Sabatia gracilis* (Michx.). Slender Sea Pink.**

Sabbatia gracilis Michaux, Fl. Bor. Am. I: 146. 1803 [Lower Carolina].

Sabbatia gracilis Britton 171.

Sabbatia campanulata Keller and Brown 255.

Brackish or fresh marshes along the coast and on the Delaware River at Burlington; local and not always clearly distinct from the last.

The record in Keller and Brown's List for Atco has not been authenticated and seems unlikely.

Fl.—Mid-July to mid-August.

Middle District.—Burlington.

Coast Strip.—Ocean Grove, Spring Lake (NB), Pt. Pleasant, Ocean Beach (C), Sherburn's (L), Court House (NB), Cold Spring (S), Cape May (S), W. Cape May.

Sabatia dodecandra (L.). Large Marsh Centaury.

Pl. CVI., Fig. 2.

Chironia dodecandra Linnæus, Sp. Pl. 190. 1753 [Virginia].—Britton 172.—Keller and Brown 255.

Sabbatia chloroides Knieskern 25.—Willis 49.

Frequent on the brackish meadows from the Hackensack marshes south. In the Cape May peninsula it occurs also in fresh marshes over a mile from the coast.

This larger species, with its more numerous petals, is not so plentiful as *S. stellaris*, but is locally abundant, notably near Absecon and at several points in Cape May County.

Fl.—Late July to late August.

Coast Strip.—Pt. Pleasant, Forked River, Spray Beach (L), Manahawkin, Cox's, Mullica River, Absecon, Pleasant Mills, Mays Landing (NB), Palermo, Clermont.

Cape May.—Court House, Wildwood Jnc., E. of Dias Creek (S), Dias Creek.

GENTIANA L.**Gentiana porphyrio J. F. Gmel. Pine Barren Gentian.**

Pl. CIV.

Gentiana Porphyrio J. F. Gmelin, Syst. II. 462. 1791 [Carolina].—Keller and Brown 257.

Gentiana angustifolia Pursh, Fl. Am. Sept. I. 186. 1814.—Knieskern 25.—Willis 49.—Britton 173.

Damp sand of the Pine Barrens, frequent, and occasional in the southern part of the Cape May peninsula.

It is probably a matter of individual preference to determine which gentian is the handsomest. The present species, found only in the remote sections of the Pine Barrens, is certainly the least known and to my mind as handsome as any. Its flaring mouth, the delicate markings within, and the intensity of the blue, make it one of the choicest blooms of the region.

It was apparently first discovered by William Bartram*, who sent a drawing of it to Edwards, the British naturalist, who published it in his Gleanings of Natural History, vol. V., p. 98, 1758, as the "Autumnal Perennial Gentian of the Desert," but it was

* (1739-1823) famous as a botanist and orinthologist, who resided at "Bartram's Garden," founded by his faather, John Bartram, also a botanist of note and correspondent of Linnæus.

not properly named until 1791, and then from the Pine Barrens of South Carolina.

Fl.—Early September into October.

Pine Barrens.—Manahawkin, Cox's, Cedar Grove (S), Cedar Bridge, Jones Mill (S), Tuckerton, Chatsworth, Atco, Atsion, Hammonton (S), Batsto, Pleasant Mills (T), Quaker Bridge, Elwood, Egg Harbor City (P).*

Cape May.—Bennett.

***Gentiana crinita* Froel. Fringed Gentian.**

Pl. CIII.

Gentiana crinita Froelich, Gent. Diss. 112. 1796 [New York].—Willis 49.—Britton 172.—Keller and Brown 256.

Frequent in damp open ground in the northern counties, occasional in the upper Middle district, and at one station on the Coast Strip.

The Fringed Gentian is a rarity within our limits, but at one station it grows in such wonderful abundance and luxuriance that one cannot imagine a spot more suited to its needs—an open bog where the Painted Cup, Tall Pedicularis and other more northern species are associated with it. The lateness of its flowering has apparently resulted in its escaping general attention and extermination. On some plants I have counted no less than thirty blossoms.

Fl.—Mid-September into October.

Middle District.—Lindenwold, Clementon.

Coast Strip.—Ocean View (S).

***Gentiana villosa* L.† Striped Gentian.**

Gentiana villosa Linnæus Sp. Pl. 228. 1753 [Virginia].—Britton 173.—Keller and Brown 256.

A single specimen found near Bridgeton, Cumberland Co., in 1881, by Drs. N. L. Britton and J. B. Potter, is the only record for the State. This specimen is still preserved in the State herbarium at New Brunswick.

***Gentiana andrewsii* Griseb. Closed Gentian.**

Pl. CV.

Gentiana Andrewsii Grisebach in Hookers Fl. Bor. Am. II. 55. 1834 [Canada].—Knieskern 25.—Willis 49.—Britton 172.

* Mays Landing (KB) was an error for Egg Harbor City.

† *Gentiana quinqueflora* Lam. is stated by Prof. Willis to grow at Freehold (Cat. p. 49). We have no other evidence of its occurrence within our limits.

642 REPORT OF NEW JERSEY STATE MUSEUM.

Low ground; common in the northern counties, occasional in the Middle district and rare on the coast and Cape May peninsula.

Fl.—Early September into October.

Middle District.—Keyport (C), Shark River (C), Pemberton (C), Kaighus Pt., Mickleton (H).

Coast Strip.—Absecon, Weeksville (C).

Cape May.—Cape May.

Gentiana saponaria L. Soapwort Gentian.

Gentiana saponaria Linnæus, Sp. Pl. 228. 1753 [Virginia].—Barton Fl. Phila. 134. 1818.—Knieskern 25.—Britton 172.—Keller and Brown 256.

Frequent in low ground in the Middle district and rare along the Coast Strip to Cape May. Occasionally ranging above the fall line in the northern counties.

Fl.—Early September into October.

Middle District.—Shark River (C), Swimming River (NB), New Egypt, Burlington, Moorestown (KB), Medford (S), Orchard (S), Lindenwold, Woodbury, So. Westville, Clementon, Berlin.

Coast Strip.—Absecon, Pleasant Mills, Mays Landing (Leeds), Cold Spring (OHB).

BARTONIA Muhlenberg.

Bartonia paniculata (Michx.). Twining Barton.

Centaurella paniculata Michaux, Fl. Bor. Am. I. 98. 1803 [Carolina].

Andrewsia paniculata Barton, Fl. Phila. 89. 1818. (Partly the next.)

Low damp ground; frequent in the Pine Barrens, Cape May and Coast districts, apparently rare and local in the Middle district.

These curious little plants, practically devoid of leaves, are more common than generally supposed, but frequently escape attention, buried as they are among the taller vegetation. They are named in honor of Prof. Benjamin Smith Barton (1766–1815), professor of botany in the University of Pennsylvania and author of a general work on botany and the interesting “Fragments of Natural History” in which the blooming of plants, arrival of birds, etc., are arranged in chronological tables.

Fl.—Late August to late September.

Middle District.—Kaighns Swamp, Dividing Creek.

Pine Barrens.—Forked River, Waretown, Manahawkin, Coxe's, Chatsworth, Hammonton, Pleasant Mills, Petersburg (S).

Coast Strip.—Barnegat City (L).

Cape May.—Bennett, Cold Spring (S), Green Creek (S).

***Bartonia virginica* (L.). Upright *Bartonia*.**

Pl. CVII., Fig. 2.

Sagina virginica Linnæus, Sp. Pl. 128. 1753 [Virginia].

Bartonia virginica Britton 173.—Keller and Brown 257.

Bartonia tenella Knieskern 25.

Low damp ground; frequent throughout our region and apparently also in the northern counties.

Fl.—Mid-July to late August.

Middle District.—Farmingdale, New Egypt, Florence, Delanco, Kaighns Pt., Medford (S), Tomlin (S), Taunton (S), Lindenwold, Mickleton, Paulsboro, Fairton (S), Beaver Dam, Dividing Creek.

Pine Barrens.—Whitings, Jones' Mills (S), Bear Swamp, Braddock's Mill, Speedwell (S), Clementon, Pleasant Mills, Egg Harbor City (S), Woodbine, Tuckahoe (S).

Coast Strip.—Pt. Pleasant, Asbury Park, Seaside Park, Spray Beach (L), Peahala (L), Sherburn's (L), Manahawkin, West Creek (S), Palermo.

Cape May.—Court House (S), Wildwood Jnc. (S), Whitesboro, Green Creek (S), Cape May (S).

OBOLARIA L.

***Obolaria virginica* L. Pennywort.**

Obolaria Virginica Linnæus, Sp. Pl. 632. 1753 [Virginia].—Britton 173.—Keller and Brown 257.

Rich woodland of the northern and Middle districts, rare especially within our limits, where it is known from but four stations.

Fl.—Late April to late May.

Middle District.—New Egypt, Haddonfield (C), Swedesboro, Salem (C).

Family MENYANTHACEÆ. Buckbeans, etc.

Key to the Species.

- a. Bog plant, leaves 3-foliate, long petioled; flowers white in an erect raceme. *Menyanthes*, p. 644
- aa. Aquatic plants. Leaves oval, heart-shaped, floating on the surface of the water with an umbel of white flowers attached just beneath and coming up to the surface when in bloom.
 - b. Flowering leaves 20–50 mm. long. *Limnanthemum lacunosum*, p. 644
 - bb. Flowering leaves 50–150 mm. long. *L. aquaticum*, p. 645

MENYANTHES L.

Menyanthes trifoliata L. Buckbean.

Menyanthes trifoliata Linnæus, Sp. Pl. 145. 1753 [Europe].—Barton, Fl. Phila. 104 and app. 215. 1818.—Pursh, Fl. Am. Sept. I. 139.—Britton 173.—Keller and Brown 257.—Stone, Barton. I. 20. 1909.

Swamps and bogs at a number of localities in the northern counties and at three isolated stations within our limits, one at Repaupo, Gloucester Co., discovered by Mr. Benj. Heritage, May 13, 1893; one at Cold Spring, Cape May Co., discovered July 15, 1906, by Messrs. C. S. Williamson, S. S. Van Pelt and the writer, and the last at West Cape May, discovered by Mr. O. H. Brown. The last is the most southern known locality for the species in America, with the exception of one station in the mountains of West Virginia.* Barton mentions a station, long since destroyed, in a bog half a mile southeast of Kaighn's Point, where it was abundant.

Fl.—Late April to late May.

Middle District.—Kaighn's Pt. (Barton), Repaupo.

Cape May.—Cold Spring, W. Cape May.

LIMNANTHEMUM S. G. Gmelin.

Limnanthemum lacunosum (Vent.). Floating Heart. †

Villarsia lacunosum Ventenat, Choix des Plantes 9. 1803 [Carolina].—Pursh, Fl. Am. Sept. I. 139. 1814.

Limnanthemum lacunosum Knieskern 25.—Britton 174.—Keller and Brown 257.

In ponds of the Pine Barrens, Coast strip and Middle district, but much less frequent in the last. There is but one record in the State north of our limits, namely at Princeton Junction.

A colony of this plant, which I found in 1910 at Centerton, was particularly attractive. Hundreds of the little heart-shaped leaves were floating on the surface of a pond interspersed everywhere with the delicate little white starry flowers, appearing in

* Cf. Sheldon, *Rhodora* 1910, p. 11.

† The nomenclature of these plants seems to require investigation by an expert. The generic name *Nymphoides* adopted in the new Gray's Manual is simply referred to in synonymy by Ventenat (Choix des Plantes 9. 1803), and his species name *lacunosa* is a new name for *aquatica* Walter proposed because *aquatica* was meaningless in a genus of exclusively aquatic plants.

some respects like miniatures of the white water lilies which occurred side by side with them.

Fl.—Early July to late August.

Middle District.—Delanco, Center Square (H), Woods Mill (KB), Swedesboro, Palatine, Centerton (S).

Pine Barrens.—Pasadena, Webb's Bridge, Ocean Co. (P), 2 miles north Speedwell (S), Vineland (KB), Franklinville, Malaga (S), Winslow, Hamonton, Atsion (NB), Quaker Bridge (Bassett), Egg Harbor City, Hospitality Br., Eighth St. (T), Mays Landing (H).

Coast Strip.—Deal, Squan, Spring Lake, Pt. Pleasant (KB), Manahawkin.

***Limnanthemum aquaticum* (Walt.). Large Floating Heart.**

Anonymos aquatica Walter, Fl. Car. 109. 1788 [Carolina].—Britton 174.

The only New Jersey station is a pond near Bridgeton, in Cumberland Co., N. J., where it was discovered by the late Prof. A. C. Apgar, August 5, 1886.

Fl.—During July and August, probably.

Middle District.—Bridgeton (NB).

Family APOCYNACEÆ. Dog Banes.

APOCYNUM L.

Key to the Species.

a. Corolla 5-9 mm. long, its lobes spreading or recurved, white or tinged with pink.

b. Corolla 8 mm. long, inflorescence partly axillary.

A. androsæmifolium, p. 645

bb. Corolla 6 mm. long, inflorescence strictly terminal. *A. medium*, p. 646

aa. Corolla 3-4.5 mm. long, its lobes erect, greenish white.

b. Branches of inflorescence and upper side of leaves glabrous.

A. cannabinum, p. 646

bb. Branches of inflorescence and upper side of leaves pubescent.

A. c. pubescens, p. 646

***Apocynum androsæmifolium* L. Dogbane.**

Apocynum androsæmifolium Linnæus, Sp. Pl. 213. 1753 [Virginia and Canada].—Knieskern 25.—Britton 168.

Frequent in the northern counties and southward mainly in the Middle district, elsewhere apparently introduced.

Fl.—Mid-June to late July or into August.

Middle District.—Shark River, New Egypt, Mickleton, Sicklerville, Swedesboro.

Pine Barrens.—Ballenger's Mill, Berlin (S), Atsion (S), Forked River, Chatsworth.

Apocynum medium Greene. **Small-flowered Dogbane.**

Apocynum medium Greene, Pittonia III. 229. 1897 [Brookland, D. C.].

Tolerably common in the Pine Barrens and probably elsewhere in cultivated ground or on roadsides; very variable and including *A. milleri* Britton and *A. urceolifer* G. S. Miller.

The Speedwell specimen has the leaves pubescent on both sides, the others only below.

Fl.—Early June to early August, occasionally later.

Pine Barrens.—Toms River, Chatsworth, Harris, Speedwell.

Apocynum cannabinum L. **Indian Hemp.**

Apocynum cannabinum Linnaeus, Sp. Pl. 213. 1753 [Canada and Virginia].—Knieskern 25.—Britton 168.

Apparently frequent throughout the State in one form or another, usually appearing as a weed within our limits, but perhaps still in its native habitat along the Coast Strip.

In all the specimens here listed the inflorescence is glabrous; some have the leaves all tomentous below, others have most of them entirely glabrous.

Fl.—Early June to late August, occasionally later.

Middle District.—Medford (S), New Egypt, Westville, Swedesboro, Mickleton, Landisville.

Coast Strip.—Surf City (L), Atlantic City, Wildwood.

Apocynum cannabinum pubescens R. Br. **Pubescent Indian Hemp.**

Apocynum pubescens R. Brown, Mem. Wern. Soc. Nat. Hist., p. 68. 1811 [Virginia].

Occasional in the Pine Barrens and probably elsewhere. A form with velvety pubescence on the inflorescence and both sides of the leaves.

Fl.—As in the preceding.

Pine Barrens.—Winslow Jnc., Landisville, Egg Harbor City.

Family ASCLEPIADACEÆ. **Milkweeds.***Key to the Species.*

- a. Corolla crown of five hooded, fleshy bodies, with an incurved horn rising from the cavity of each hood.
 - b. Leaves hirsute pubescent, mainly alternate, corolla and hood both orange. *Asclepias tuberosa*, p. 647
 - bb. Leaves glabrous or nearly so, verticillate.

- c. Leaves narrowly linear, 3-7 in a whorl; corolla greenish-white, hood white. *A. verticillata*, p. 651
- cc. Leaves ovate or lanceolate 3-4 in a whorl, corolla pink, hood white. *A. quadrifolia*, p. 650
- bbb. Leaves glabrous or in some species downy-pubescent, opposite.
- c. Corolla bright red, hood orange, leaves linear lanceolate. *A. lanceolata*, p. 650
- cc. Corolla and hood various shades of pink or purple.
- d. Plant essentially glabrous.
- e. Leaves oblong, clasping at the base, margins wavy. *A. amplexicaulis*, p. 648
- ee. Leaves not wavy margined.
- f. Leaves lanceolate, acute or acuminate. *A. rubra*, p. 648
- ff. Leaves oblong rounded at the end. *A. purpurascens*, p. 648
- dd. Plants pubescent, especially on the under side of the leaves.
- e. Leaves 10-12 x 3-3.5 mm., often lanceolate. *A. pulchra*, p. 649
- ee. Leaves 12-15 x 5-7 mm., oblong.
- f. Flowers entirely purple. *A. purpurascens*, p. 648
- ff. Flowers more or less greenish. *A. syriaca*, p. 651
- ccc. Corolla white or green, hood white or pinkish.
- d. Corolla green, plant 10-20 dm. high. *A. exaltata*, p. 650
- dd. Corolla white, plant 3-9 dm. high. *A. variegata*, p. 649
- aa. Corolla crown, without incurved horns, flowers entirely green. *Acerates viridiflora*, p. 651

ASCLEPIAS L.

Asclepias tuberosa L. Butterfly Weed.

Pl. CVIII, Fig. 2.

Asclepias tuberosa Linnæus, Sp. Pl. 217. 1753 [North America].—Kneskern 25.—Britton 170.—Keller and Brown 259.

Asclepias decumbens Keller and Brown 260.

Open sandy ground; common throughout the State, except in the Pine Barrens, where it has apparently been introduced, and is only common locally in cultivated ground.

Fl.—Late June to early August, sporadically somewhat later.

Middle District.—Farmingdale, New Egypt, Haddonfield (S), Medford (S), Washington Pk., Tomlin (S), Mickleton, Clementon, Sicklerville, Beaver Dam.

Pine Barrens.—Landisville, Vineland (S), Egg Harbor City, Folsom, Manumuskin (S), Woodbine (S).

Coast Strip.—Pt. Pleasant, Manahawkin, St. Albans (L), West Creek (S), Tuckerton, Atlantic City, Pleasantville, Mays Landing (S), Sea Isle Jnc. (S).

Cape May.—Cape May (UP).

***Asclepias purpurascens* L. Purple Milkweed.**

Asclepias purpurascens Linnæus, Sp. Pl. 214. 1753 [Carolina].—Britton 169.

Frequent in dry ground of the northern counties and rather rare southward, occurring in the Middle district only.

Fl.—Mid-June to mid-July.

Middle District.—Farmingdale, New Egypt, Crosswicks, Camden (C), Riddleton, Elsinboro, Clarksboro (UP).

Specimens are also preserved in several herbaria from Landisville (C. A. Gross). There seems to be an intrusion of Middle district plants up the tributaries of the Maurice River which may account for this record.

***Asclepias rubra* L. Red Milkweed.**

Asclepias rubra Linnæus, Sp. Pl. 217. 1753 [Virginia].—Willis 50.—Britton 170.—Keller and Brown 260.

Asclepias acuminata Pursh, Fl. Am. Sept. I. 182. 1814 [Cedar Swamps, N. J., &c.].

Asclepias periplocaefolia Nuttall, Gen. I. 167. 1818 [N. J. to Fla.].

Frequent in bogs of the Pine Barrens and rare or occasional in similar situations in the Middle and Cape May districts.

This is the typical Milkweed of the Pine Barrens and finds here the northern limit of its distribution.

Fl.—Late June to late July, sporadically into August.

Middle District.—Burlington, Pemberton (C), Griffith's Swamp, Lindenwold, Mickleton.

Pine Barrens.—Ocean Grove (P), Toms River (McKenzie), Pt. Pleasant (S), Bamber, Waretown (C), Barnegat (NB), Manahawkin, Coxe's, Tuckerton, Speedwell (S), High Bridge (S), Chatsworth, White Horse (S), Landisville, Hammonton, Atsion (S), Quaker Bridge (NB), Batsto, Pleasant Mills (P), Egg Harbor City (UP), Hospitality Br. 8th St. (T).

Cape May.—Goshen, Cold Spring (S), Cape May (P).

***Asclepias amplexicaulis* Michx. Blunt-leaved Milkweed.**

Asclepias amplexicaulis Michaux, Fl. Bor. Am. I. 115. 1803 [Savannah, Ga.].—Keller and Brown 260.

Asclepias obtusifolia Pursh, Fl. Am. Sept. I. 182. 1814.—Barton, Fl. Phila. 133. 1818.—Knieskern 25.—Britton 170.

Common in woods and open ground throughout the coastal plain with the exception of the Cape May peninsula; also at a number of localities above the fall line in the northern counties

Fl.—Mid-June to mid-July, sporadically into August.

Middle District.—Farmingdale, New Egypt, Burlington, Riverside, Pensauken, Locust Grove (S), Gloucester, Lawnside (S), Bridgeport, Tomlin (S), Williamstown, Sicklerville, Yorktown, Husted (S), Elmer (P), Franklerville (P).

Pine Barrens.—Whitings, Forked River, W. Plains (S), Albion, Williamstown Inc., Cedar Brook, Landisville, Inskip, Winslow Inc., Hammonton (Bassett), Atsion, Atco (UP), Mouth of Batsto, Egg Harbor City, Belleplain (S).

Coast Strip.—Belmar (UP), Surf City (L), Mays Landing (UP), Cape May (UP).

***Asclepias pulchra* Ehrh. Hairy Milkweed.**

Pl. CIX., Fig. 1.

Asclepias pulchra Ehrhart, in Willdenow Sp. Pl. I. 1267. 1798 [North America].

Asclepias incarnata var. *pulchra* Britton 170.

Asclepias incarnata Knieskern 25.

Moist open ground; common throughout the Middle, Coast and Cape May districts, and ranging over much of the Northern district, but replaced in the mountains by *A. incarnata*. Not found in the Pine Barrens.

Fl.—Early July to mid-August.

Middle District.—New Egypt, Camden (P), Medford (S), Pemberton Inc. (S), Tomlin, Albion, Swedesboro, Salem (S).

Coast Strip.—Long Branch (UP), Seaside Park (UP), Surf City (L), Beach Haven (L), Spray Beach (L), Absecon, Atlantic City (S), Mays Landing, Ocean City (S), Tuckahoe (T), Piermont (S), Five-Mile Beach, Cape May (S).

***Asclepias variegata* L. White Milkweed.**

Asclepias variegata Linnæus, Sp. Pl. 215. 1753 [North America].—Barton, Fl. Phila. 133. 1818.—Britton 169.—Keller and Brown 260.

Sandy woodlands; locally distributed through the Middle and Cape May districts, rarely occurring above the fall line in the northern counties.

Fl.—Early June to early July.

Middle District.—Smithville (C), Burlington, Birmingham (C), Moorestown (C), Camden (P), Locust Grove (S), Medford, Washington Park, Mickleton, Sicklerville, Swedesboro.

Pine Barrens (?).—Vineland (C), Hammonton (C).

Coast Strip.—Palermo.

Cape May.—Bennett, Cold Spring (S).

***Asclepias exaltata* (L.). Tall Milkweed.**

Asclepias Syriaca var. *exaltata* Linnæus, Sp. Pl. Ed. 2. 313. 1762 [Virginia].
Asclepias exaltata Britton 169.—Keller and Brown 260.

Edges of woods and thickets; rather frequent in the northern counties, but only known within our limits from the record in Britton's Catalogue: "Roadside near Moorestown—Miss Anna M. Kaighn," and the statement of Mr. C. S. Williamson that he once observed it at Mt. Holly. No specimens are preserved. The record for "Egg Harbor [City]—Leeds" in Brown and Keller's List is *A. rubra*.

***Asclepias quadrifolia* Jacq. Four-leaved Milkweed.**

Asclepias quadrifolia Jacquin, Obs. Part 2, 8 pl. 33. 1767 [Virginia].—Britton 170.

Frequent in dry woods of the northern counties; rare within our limits and confined to the Middle district.

Fl.—Late May to late June.

Middle District.—Little Timber Creek (C), Atco, Swedesboro.

***Asclepias lanceolata* Walt. Smooth Orange Milkweed.**

Pl. CIX, Fig. 2.

Asclepias lanceolata Walter, Fl. Car. 105. 1788 [Carolina].—Britton 170.—Keller and Brown 260.

Asclepias pauperula Knieskern 25.—Willis 50.

Found only along the Coast strip, where the salt meadows join the mainland; somewhat locally distributed and not detected north of Pt. Pleasant, which is, therefore, the most northern station for the species, as it does not range north of New Jersey.

This is one of the finest of our milkweeds. Its flowers are larger than those of any other species and the brilliant red and orange coloring makes it especially conspicuous among the many showy flowers of the marsh edge. Its slender, glabrous foliage, too, gives it a delicacy that is missing in the coarse-leaved species. Though said in the books to be a plant of "wet pine barrens," it is, so far as New Jersey is concerned, strictly confined to the edge of the salt marshes, where they join the upland.

Fl.—Late June to late July.

Coast Strip.—Pt. Pleasant, Forked River (KB), Manahawkin, West Creek, C. M. Court House, Opp. Anglesea (C), Bennett, Cold Spring, Cape May.

***Asclepias syriaca* L. Common Milkweed.**

Asclepias syriaca Linnæus, Sp. Pl. 214. 1753 [Virginia].—Britton 169.

Asclepias cornuti Knieskern 25.

Generally distributed in rich open ground, except in the Pine Barrens, where it is strictly confined to cultivated and waste ground and is obviously introduced. Everywhere, however, it is largely a weed, and it is impossible at this time to ascertain just what its native habitat may have been.

Fl.—Mid-June to late July.

Middle District.—Farmingdale, Burlington, Locust Grove (S), Medford (S).

Pine Barrens.—Mays Landing.

Coast Strip.—St. Albans (L), Barnegat City (L).

Cape May.—Cold Spring (S).

***Asclepias verticillata* L. Whorled Milkweed.**

Asclepias verticillata Linnæus, Sp. Pl. 217. 1753 [Virginia].—Pursh, Fl. Am.

Sept. I. 183.—Barton, Fl. Phila. 133. 1818.—Britton 170.—Keller and Brown 261.

In sandy or rocky places; locally throughout the State. Most frequent within our limits in the Middle district, but nowhere common. Barton knew it only from a bog a quarter of a mile north of Kaighns Point. In Pennsylvania it is a characteristic plant of the serpentine barrens of Chester and Delaware Counties.

Fl.—Early July to mid-August.

Middle District.—Holmdel (C), Red Bank (NB), Leedsville (C), Freehold (C), Birmingham (C), Kaighns Pt., Medford, Clarksboro (P), Mickleton, Berlin, Glassboro, Swedesboro, Oliphant's Mill (KB), Bridgeton, Millville (KB).

Pine Barrens.—Newtonville, Tuckahoe (S).

Cape May.—One mile east Dias Creek.

ACERATES Elliott.***Acerates viridiflora* (Raf.). Green Milkweed.**

Asclepias viridiflora Rafinesque, Med. Rep. (II.) 5. 360. 1808 [Maryland and Pennsylvania].

Acerates viridiflora Willis 50.—Keller and Brown 261.

Open sandy ground or limestone cliffs; locally distributed in the northern counties. Known within our limits only from Black's Mills, Monmouth County, where it was obtained by the Rev. Samuel Lockwood, according to Britton's Catalogue. It

has been introduced as a weed at Cold Spring, Cape May County (O. H. Brown).

A characteristic plant of the serpentine outcrops of southeastern Pennsylvania and perhaps not native anywhere in southern New Jersey.

Fl.—Late June to mid-August, and sporadically into September.

Order POLEMONIALES.

Family CONVULVULACEÆ. Morning Glories.

Key to the Species.

- a. Style two cleft, flowers white. *Breweria*, p. 652
- aa. Style entire, up to the stigma.
- b. Stigmas two, filiform to oblong.
- c. Calyx with two large bracts at the base, which enclose it.
- d. Plant trailing.
- e. Glabrous, leaves hastate, flowers pink with white stripes or white. *Convolvulus sepium*, p. 653
- ee. Pubescent, leaves cordate, flowers white. *C. repens*, p. 654
- dd. Plant upright, flowers white. *C. spithameus*, p. 653
- cc. Calyx without bracts, flowers pink or white. [*C. arvensis*]*
- bb. Stigmas one or two, capitate or globose.
- c. Flowers white, sometimes with striped throat, leaves cordate or often contracted in the middle.
- d. Corolla 50–80 mm. long. *Ipomœa pandurata*, p. 653
- dd. Corolla 8–20 mm. long. *I. lacunosa*, p. 653
- cc. Flowers normally blue, sometimes pink, white or variegated.
- d. Leaves entire, cordate. [*I. purpurea*]†
- dd. Leaves deeply three-lobed. [*I. hederacea*]‡

BREWERIA R. Browne.

Breweria pickeringii (M. A. Curtis). **Pickering's Morning Glory.**

Convolvulus Pickeringii M. A. Curtis, Bost. Jour. Nat. Hist. I. 130. 1837 [Wilmington, N. C.].

Bonania Pickeringii Willis 48.

Breweria Pickeringii Britton 180.—Keller and Brown 263.

Confined to dry sandy banks in the Pine Barrens, where it is known from probably not more than three or four stations. Certain it is that two, and probably three, of those given in

* Small Bindweed. A weed in fields and waste ground.

† Morning Glory. Escaped in waste ground, fields, etc.

‡ Ivy-leaved Morning Glory. Often escaped, less frequent than the last.

Britton's Catalogue refer to the same colony of plants. Named for Charles Pickering (1805-1878), a prominent Philadelphia naturalist, member of the Wilkes Exploring Expedition, and prominent in local botanical work.*

Fl.—Mid-July to late August.

Pine Barrens.—Pleasant Mills, Batsto, between Atsion and Quaker Bridge, Little Egg Harbor R. (C), three miles above Atsion (Williamson), Chatsworth (H).

IPOMŒA L.†

Ipomœa pandurata (L.). Wild Potato.

Convolvulus panduratus Linnæus, Sp. Pl. 153. 1753 [Virginia].—Barton Fl. Phila. I. 107. 1818.

Ipomœa pandurata Knieskern 24.—Willis 48.—Britton 179.

Open sandy ground or thickets in nearly all parts of the State, except the Pine Barrens, but nowhere very common.

Fl.—Early July into October.

Middle District.—New Egypt, Florence Heights, Kaighns Pt., Lawnside (S).

Pine Barrens.—Newtonville.

Cape May.—1 mile east Dias Creek (S), Cape May.

CONVOLVULUS L.

Convolvulus spithamæus L. Upright Morning Glory.

Convolvulus spithamæus Linnæus, Sp. Pl. 150. 1753 [Virginia].—Britton 180.—Keller and Brown 264.

Calystegia spithamæa Willis 48.

Convolvulus stans Barton, Fl. Phila. I. 158. 1818.

Sandy ground in the Northern and Middle districts; local, and at some stations certainly a weed.

Fl.—Late May to late June.

Middle District.—Long Branch, Camden (S), Collingswood (S), Rid-dleton.

Convolvulus sepium L. Hedge Morning Glory or Bindweed.

Convolvulus sepium Linnæus, Sp. Pl. 153. 1753 [Europe].—Britton 179.

Calystegia sepium Knieskern 24.

Middle District.—Farmingdale, Delair, Washington Park, Mickleton, Salem (S), Beaver Dam.

*Cf. Proc. Am. Acad. Arts and Sci. XIII., 414.

†*Ipomœa lacunosa* is entirely an introduced species within our limits.

Frequent in moist soil; Northern, Middle and Coast districts south to Cape May; most common along streams and on the juncture of the salt marshes and sand dunes along the coast.

Fl.—Early June to late August, sporadically into September.

Middle District.—Farmingdale, Delair, Washington Park, Mickleton, Salem (S), Beaver Dam.

Pine Barrens.—Landisville (T).

Coast Strip.—Barnegat City (L), St. Albans (L), Spray Beach (L), Surf City (L), Atlantic City (S), Ocean City, Piermont (S), Wildwood (UP), Cold Spring (S), Cape May (S), Cape May Pt. (S).

Convolvulus sepium repens L.

Convolvulus repens Linnæus, Sp. Pl. 158. 1753 [America, on the coast].

Tolerably common along the Coast strip.

Fl.—Probably as in the last.

Coast Strip.—Long Branch, Barnegat City (L), Spray Beach (L), Surf City (L), Beach Haven (L), Stone Harbor, Wildwood, Cape May (OHB).

Family CUSCUTACEÆ. Dodders.

Key to the Species.

- a. Stigmas elongated; capsule circumscissile. [*Cuscuta epithymum*]*
- aa. Stigmas capitate; capsule indehiscent.
 - b. Sepals united.
 - c. Capsule depressed, globose.
 - d. Flowers in globular clusters, corolla persistent at the base of the capsule. *C. arvensis*, p. 655
 - dd. Flowers in panicle, often densely compound cymes, corolla withering on the summit of the large capsule. *C. cephalanthi*, p. 655
 - cc. Capsule pointed, capped by the persistent corolla, flowers in loose panicle cymes. *C. gronovii*, p. 655
 - bb. Sepals distinct, five, capsule capped by the persistent corolla, flowers in sessile, densely-compact clusters. *C. compacta*, p. 655

These curious parasites are quite conspicuous, especially in the swamps of the Middle district, where their bright orange, naked stems may be seen trailing about over the shrubs and tall herbs, attaching themselves to the stems and branches. The group has received but little critical study in our region and further collections may alter our ideas upon the relative abundance and distribution of the several species. (Cf. Matthew Bull. Torr. Bot. Club XX. 310.)

* Clover Dodder. Introduced on clover.

CUSCUTA L.***Cuscuta gronovii* Willd. Dodder.**

Cuscuta Gronovii Willdenow, in Roemer and Schultes Syst. 6:205. 1820 [Virginia].—Britton 180.

Cuscuta glomerata Knieskern 24.

Moist ground; frequent in the Northern and Coast districts, less common elsewhere; not known in the Pine Barrens.

Fl.—Early August through September. *Fr.*—Early September into autumn.

Middle District.—Medford (S).

Coast Strip.—Seaside Park, Surf City (L), Barnegat City Jnc. (I.), Beach Haven (L), Sherburn's (L), Ocean City (S).

Cape May.—1 mile east Dias Creek (S).

***Cuscuta arvensis* Beyrich. Field Dodder.**

Cuscuta arvensis Beyrich in A. Gray Manual, Ed. 2. 236. 1856 [N. W. America].—Willis 48.—Britton 180.—Keller and Brown 264.

Locally common in the northern counties; reported within our limits from the Middle and Cape May districts; rare.

Fl.—Mid-July into September. *Fr.*—Mid-August into autumn.

Middle District.—Shark River (C), Delanco (S), Salem (C).*

Pine Barrens.—Hammonton (C), Egg Harbor (CDL), Parkdale (S), Quaker Bridge (S).

Cape May.—Cape May (P).

***Cuscuta cephalanthi* Engelm. Button-bush Dodder.**

Cuscuta Cephalanti Engelman, Am. Jour. Sci. 43:336 pl. 6, fig. 1-6. 1842 [St. Louis, Mo.].—Britton 180.—Keller and Brown 265.

Reported only from the Pine Barrens.

Quaker Bridge (NJ), Toms River (C), Swedesboro (KB).

***Cuscuta compacta* Juss. Compact Dodder.**

Cuscuta compacta Jussieu, in Choisy, Mem. Soc. Gen. IX. 281 t, 4, fi. 2. 1842 [North America].—Britton 181.—Keller and Brown 265.

Frequent in the Middle and Pine Barren districts.

Fl.—Early August through September. *Fr.*—Early September into autumn.

* Swedesboro (KB) was an error for Egg Harbor City.

656 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—Pemberton (KB), Camden, Laurel Springs (KB), Westville (KB), Delanco (S), Medford (S), Swedesboro (CDL), Woodstown (KB).

Pine Barrens.—Toms River (P), Whitings (S), Barnegat, New Germany (KB), Hammonton (KB), Weymouth, Egg Harbor City (NB), Mays Landing (KB), Tuckahoe (S).

Family POLEMONIACEÆ. Phloxes.

Key to the Species.

- a. Corolla salver-form, leaves opposite, entire, flowers pink.
 - b. Leaves subulate, stems creeping. *Phlox subulata*, p. 657
 - bb. Leaves flat.
 - c. Stems glabrous or nearly so, spotted with purple. *P. maculata*, p. 656
 - cc. Stems soft, downy. *P. pilosa*, p. 656
- aa. Corolla tubular, bright scarlet. [*Gilia rubra* L.]*
- aaa. Corolla open, bell-shaped, blue; leaves pinnate. *Polemonium reptans*, p. 657

PHLOX L.

Phlox maculata L. Spotted-stemmed Phlox.

Pl. LIV, Fig. 1.

Phlox maculata Linnæus, Sp. Pl. 152. 1753 [Virginia].—Barton, Fl. Phila. I. 107. 1818.—Britton 174.

Moist open ground; frequent or occasional in the Middle and Cape May districts and up the Delaware to Hunterdon County.

Fl.—Mid-May to late June.

Middle District.—New Egypt, Bordentown (C), Burlington, Birmingham (C), Vincentown (C), Griffith's Swamp, Lindenwold, Medford (S), Mickleton, Sewell (S), Swedesboro, Salem (C).

Cape May.—Cold Spring, Cape May (P).

Phlox pilosa L. Downy Phlox.

Phlox pilosa Linnæus, Sp. Pl. 152. 1753 [Virginia].—Knieskern 24.—Willis 47.—Britton 174.—Keller and Brown 266.

Open sandy ground; mainly in the northern counties and at several stations in the Middle district; always local.

Middle District.—Burlington, Moorestown (C), Woodbury (C), "Ocean Co." (Kn).

* Scarlet *Gilia*, escaped from cultivation about Manumuskin, its gorgeous scarlet spikes standing out brilliantly against the green of the pines.

Phlox subulata L. Moss Pink.

Phlox subulata Linnæus, Sp. Pl. 152. 1753 [Virginia].—Pursh Fl. Am. Sept. I. 151. 1814.—Barton Fl. Phila. I. 108. 1818.—Britton 175.—Keller and Brown 200.

Rocky and sandy exposed banks; at a number of stations in the Northern and upper Middle districts.

This and *Viola pedata lineariloba* make a brilliant show between Moorestown and New Lisbon along the railroad banks in alternating beds of pink and blue.

Fl.—Mid-April to late May and often again in autumn.

Middle District.—Red Bank (C), Ewansville (NB), Birmingham (C), Moorestown (NB), Merchantville (KB), Vincentown (C), Camden, Cinnaminson (KB), Mickleton, Blackwood (KB), Almonesson (KB), Swedesboro.

POLEMONIUM L.**Polemonium reptans L. Jacob's Ladder.**

Polemonium reptans Linnæus, Syst. Nat. Ed. 10, 925. 1759 [based on Miller Gard. Dict., pl. 209, from N. A.].—Britton 175.—Keller and Brown 266.

Rich woods; very rare; known from one station in Warren County and several in the western part of the Middle district.

Fl.—Early May to early June.

Middle District.—Bordentown (NB), Bet. Haddonfield and Camden (C), Three m. west Woodstown.

Family HYDROPHYLLACEÆ. Water-leaf.**HYDROPHYLLUM L.****Hydrophyllum virginianum L. Virginia Water-leaf.**

Hydrophyllum virginianum Linnæus, Sp. Pl. 146. 1753 [Virginia].
Hydrophyllum virginicum Britton 175.

Rich woods; frequent in the northern counties, but rare within our limits and confined to the upper Middle district.

Fl.—Early May to early June.

Middle District.—Freehold (C), New Egypt.

Family BORAGINACEÆ. Forget-me-not, etc.

Key to the Species.

- a. Nutlets armed with prickles.
 - b. Flowers and nutlets 8–10 mm. broad.
 - c. Flowers reddish purple, nutlets flat, stem leafy to top. [Cynoglossum officinale]*
 - bb. Flowers 2 mm. broad white, nutlets 4 mm. broad. *Lappula*, p. 658
- aa. Nutlets unarmed.
 - b. Flowers regular.
 - c. Corolla funnel-shaped, blue, 20 mm. long, whole plant glabrous. *Mertensia*, p. 658
 - cc. Corolla much less than 20 mm. long, plant bristly hairy or roughened (or nearly glabrous in *Myosotis laxa*).
 - d. Racemes leafy.
 - e. Plant minutely roughened. [*Lithospermum arvense*]†
 - ee. Plant harsh with appressed bristles. *Onosmodium virginianum*, p. 659
 - dd. Racemes naked or leafy at the base.
 - e. Appressed pubescent, flowers blue. *Myosotis laxa*, p. 659
 - ee. Bristly hirsute, flowers white. *M. virginica*, p. 659
 - bb. Flowers irregular, blue, plants very rough bristly. [*Echium vulgare*]‡

LAPPULA Moench.

Lappula virginiana (L.). Virginia Stickseed.

Myosotis virginiana Linnæus, Sp. Pl. 131. 1753 [Virginia].

Echinosperrum virginianum Britton 177.

Lappula virginiana Keller and Brown 268.

Frequent in woods and thickets of the northern counties; not common within our limits and confined to the Middle district.

Fl.—Early July to late August. *Fr.*—Mid-August into October.

Middle District.—Freehold (C), New Egypt, Oaklyn (S), Mickleton (H), Mullica Hill (H), Swedesboro (CDL).

MERTENSIA Roth.

Mertensia virginica (L.). Virginia Cowslip.

Pulmonaria virginica Linnæus, Sp. Pl. 135. 1753 [Virginia].

Mertensia virginica Britton 177.—Keller and Brown 269.

* Hound's Tongue, waste ground.

† Corn Gromwell, a weed in sandy ground.

‡ Bugloss, local in waste places; roadsides, etc., rare.

Meadows along the Raritan and in the Delaware Valley near Trenton and one or two other stations; rare.

Fl.—Late April to mid-May.

Middle District.—Walnford (C), Hornerstown, between Bordentown and Lumberton.

MYOSOTIS L.

Myosotis laxa Lehm. **Smaller Forget-me-Not.**

Myosotis laxa Lehmann, *Asperif.* 83. 1818 [North America].

Myosotis palustris var. *laxa* Willis 47.—Britton 177.

Myosotis palustris Knieskern 24.

Common in the northern counties and frequent in the Middle district. One record each for the Pine Barrens and Cape May, the former possibly based on an introduction.

Fl.—Mid-May into September.

Middle District.—Deal Beach (NB), New Egypt, Pemberton Jnc. (S), Lindenwold (S), Medford (S), Mickleton (H), Pitman, Mantua, Swedesboro, Mannington (C).

Pine Barrens.—White Horse (S).

Cape May.—Cape May (OHB).

Myosotis virginica (L.). **Scorpion Grass.**

Lycopsis virginica Linnæus, *Sp. Pl.* 139. 1753 [Virginia].

Myosotis virginica Britton 178.

Open sandy ground; frequent or occasional, except in the Pine Barrens.

Fl.—Late April to mid-June.

Middle District.—New Egypt, Crosswicks, Brown's Mills, Hainesport, Glassboro, Woodbury, Medford (S), Locust Grove, Westville, Washington Park, Mickleton, Mantua, Swedesboro.

Cape May.—Cape May (OHB).

ONOSMODIUM Michaux.

Onosmodium virginianum (L.). **Virginia False Gromwell.**

Lithospermum virginianum Linnæus, *Sp. Pl.* 132. 1753 [Virginia].

Onosmodium Virginianum Britton 178.—Keller and Brown 270.

Purshia hispida Barton, *Fl. Phila.* I. 103. 1818.

Open sandy ground; occasional throughout the Middle district, extending northward in the Delaware Valley. The only Pine Barren records seem to be introductions, and the plant has a tendency to become a weed elsewhere.

Fl.—Early June to early July. *Fr.*—Early July to early August or into September.

Middle District.—Keyport (C), Birmingham (NB), Griffith's Swamp (S), Medford (S), Westville (KB), Woodbury (H), Lindenwold (S), Clementon, Iona (P), Centerton (S).

Pine Barrens.—Folsom, Hammonton (Bassett).

Family VERBENACEÆ. Verbenas.

Key to the Species.

- a.* Plant decumbent, flowers in a globular head. *Lippia*, p. 661
- aa.* Plant erect, flowers in slender spikes.
 - b.* Flowers white. *Verbena urticifolia*, p. 660
 - bb.* Flowers blue or purplish.
 - c.* Leaves lanceolate, acuminate, petioled. *V. hastata*, p. 660
 - cc.* Leaves linear to spatulate, lanceolate, mainly sessile. *V. angustifolia*, p. 661.

VERBENA L.

Verbena urticifolia L. White Verbena.

Verbena urticifolia Linnæus, Sp. Pl. 20. 1753 [Virginia and Canada].—Knieskern 23.—Britton 194.

Frequent in the Northern and Middle districts; usually in cultivated or waste ground. Two records from the Pine Barrens are obviously recently introduced plants.

Fl.—Late June to early September.

Middle District.—New Egypt, Swedesboro (CDL).

Pine Barrens.—Landisville (T), Weymouth.

Verbena hastata L. Purple Verbena, Blue Vervain.

Verbena hastata Linnæus, Sp. Pl. 20. 1753 [Canada].—Barton Fl. Phila. II. 41. 1818.—Knieskern 23.—Britton 194.

Open moist ground; common throughout the State, except in the Pine Barrens, where it is absent.

One of the components of the typical late summer flora of the damp meadows and swamps of the Middle district, along with *Eupatorium maculatum*, *E. perfoliatum*, *Asclepias pulchra*, *Veronica noveboracensis*, etc.

Fl.—Late June to early September.

Middle District.—Farmingdale, New Egypt, Masonville, Pemberton Jnc. (S), Medford (S), Chairville (S), Oaklyn (S), Lawnside (S), Clementon, Swedesboro (CDL), Beaver Dam.

Coast Strip.—Peahala (L), Beach Haven Terrace (L), Absecon (S), Atlantic City (S), Crowleytown, Ocean City (S).

Cape May.—Court House (S), Dias Creek.

Verbena angustifolia Michx. **Narrow-leaved Verbena.**

Verbena angustifolia Michaux, Fl. Bor. Am. II. 14. 1803 [Tennessee and Carlisle, Pa.].—Knieskern 23.—Britton 194.—Keller and Britton 271.

Open ground; occasional throughout the State, especially in the Middle district. A weed in many places, and the few Pine Barren records are all to be so regarded.

Fl.—Early June to late July and sporadically into September.

Middle District.—New Egypt, Delanco, New Lisbon (KB), Mickleton (KB), Lake Church, Asbury, Sicklerville, Swedesboro (KB).

Pine Barrens.—Winslow Jnc., Hammonton, Absecon (S).

LIPPIA L.**Lippia lanceolata** Michx. **Fog-fruit.**

Lippia lanceolata Michaux, Fl. Bor. Am. II. 15. 1803 [near Ashley, Carolina].—Keller and Brown 272.

Found only at Wildwood, on the coast; a southern plant pushing north also along the Susquehanna Valley in Pennsylvania.

Fl.—Late July into September.

Coast Strip.—Wildwood.

Family **LABIATÆ**. Mints, etc.*Key to the Species.*

- a. Corolla five parted, lobes nearly or quite equal, not two-lipped.
 - b. Flowers blue, 1-3 on terminal or axillary pedicels.
 - c. Flowers solitary at the ends of the branches or axillary branchlets 12-18 mm. long, stamens much exserted. Plant 2-6 dm. high.
 - d. Leaves oblong or lanceolate. *Trichostema dichotomum*, p. 664
 - dd. Leaves linear. *T. lineare*, p. 664
 - cc. Flowers axillary, on 1-3 flowered pedicels, 4-6 mm. long. Plant 2-5 dm. high. Viscid pubescent. *Isanthus*, p. 664
 - bb. Flowers purplish or white, often very small, in dense axillary clusters, or forming a terminal interrupted spike.
 - c. Plants strongly odorous, anther-bearing stamens 4. *Mentha*, p. 673
 - cc. Plants not odorous, anther-bearing stamens 2. *Lycopus*, p. 672
- aa. Corolla very irregular, apparently only one-lipped, the upper lip very short and inconspicuous stamens exserted, flowers pink or purplish.
 - b. Leaves lanceolate to ovate, glabrous or sparingly appressed pubescent. *Teucrium canadense*, p. 663
 - bb. Leaves narrower, densely appressed pubescent and papillose, plant shorter and stiffer. *T. canadense littorale*, p. 663
- aaa. Corolla distinctly two-lipped.
 - b. Calyx with a protuberance on the upper side. *Scutellaria*, p. 664

bb. Calyx without a protuberance on upper side.

c. Upper lip concave.

d. Anther-bearing stamens 4.

e. Upper pair longer than the lower.

f. Tall herbs (6-15 dm.) glabrous or slightly pubescent, leaves serrate, petioled, flowers in a dense terminal spike.

g. Corolla greenish-yellow, scarcely exceeding the calyx. *Agastache nepetoides*, p. 666

gg. Corolla bluish, slightly exceeding the calyx.

A. scrophularifolia, p. 666

ff. Erect, densely whitish downy herbs 6-9 dm. high, with oblong, petioled, crenate, leaves and small, whitish, purple dotted flowers, in verticillate clusters forming interrupted terminal spikes.

[*Nepeta cataria*]¹

fff. Low creeping herbs with reniform crenate leaves and blue flowers in axillary verticillate clusters.

[*Glechoma hederacea*]²

ee. Upper pair of stamens shorter than the lower.

f. Calyx distinctly two-lipped; low herbs 5-6 dm. high, with petioled, oblong, leaves and blue flowers 8-12 mm. long in dense bracted spikes or heads.

Prunella vulgaris, p. 666

ff. Calyx not distinctly two-lipped.

g. Decumbent herbs with orbicular, coarsely crenate, leaves, and reddish-purple flowers 12-16 mm. long in axillary and terminal clusters.

[*Lamium amplexicaule*]³

gg. Upright herbs with pink or purple flowers in verticillate, clustered, terminal spikes or axillary.

h. Leaves three parted or cleft.

[*Leonurus cardiaca*]⁴

hh. Leaves linear, lanceolate or oblong.

i. Leaves narrowed at the base, linear 2-5 mm. wide; plant 3-5 dm. high, nearly glabrous. *Stachys hyssopifolia*, p. 667

ii. Leaves cordate or truncate at the base, lanceolate to ovate, plant 3-12 dm. high. Rough hairy or pubescent.

j. Leaves all very short petioled, stem pubescent all over. *S. palustris*, p. 667

jj. Leaves with petioles 6-35 mm. long, stem pubescent on the angles only.

S. aspera, p. 667

¹ Catnip. This and the following are common weeds about houses, etc.

² Ground Ivy.

³ Henbit.

⁴ Mother-wort.

dd. Anther-bearing stamens 2.

e. Calyx 2-lipped, flowers blue, 20–30 mm. long, in whorls.

Salvia lyrata, p. 667

ee. Calyx tubular equally 5-toothed, corolla elongated, 25–40 mm. long, flowers in dense terminal or axillary capitate clusters, with colored leaf-like bracts immediately below.

f. Flowers lilac or purplish. *Monarda fistulosa*, p. 668

ff. Flowers yellowish, the upper lip spotted with purple.

M. punctata, p. 668

cc. Upper lip flat or only slightly concave.

d. Flowers in axillary whorls or terminal capitate clusters, white or purple.

e. Stamens curved, often more or less converging.

f. Anther-bearing stamens 2. Low herbs, 1.5–4 dm. high, flowers 6 mm. long, purple, in axillary clusters or interrupted spikes, and small nearly glabrous leaves.

Hedeoma, p. 668

ff. Anther-bearing stamens 4. Herbs 3–6 dm. high, hirsute, with dense axillary or terminal clusters of pink flowers.

Clinopodium vulgare, p. 669

ee. Stamens never curved, often divergent.

f. Anther-bearing stamens 4. Very small white or purple-dotted flowers in dense terminal or axillary glomerules or cymose clusters.

Koellia, p. 669

ff. Anther-bearing stamens 2. Flowers lilac, 10–12 mm. long, in loose cymose terminal clusters.

Cunila, p. 671

dd. Flowers in an open terminal panicle, yellow.

Collinsonia, p. 674

TEUCRIUM L.

Teucrium canadense L. **Germander.**

Teucrium canadense Linnæus, Sp. Pl. 564. 1753 [Canada].—Knieskern 23.
—Britton 203.

Low moist ground; frequent in the Northern and Middle districts.

Fl.—Late June to early August and sporadically into September.

Middle District.—New Egypt, Cooper's Ferry, Washington Park, Swedesboro, Salem (S).

Teucrium canadense littorale (Bicknell). **Coast Germander.**

Teucrium littorale Bicknell, Bull. Torr. Club. 1901. 160 [York Harbor, Me.].

Frequent along the edge of the maritime marshes.

Fl.—Early July to early August, sporadically later.

Coast Strip.—Pt. Pleasant (S), Seaside Park, Ship Bottom (L), Tucker's (L), Atlantic City (T), Beesley's Pt. (S), Piermont (S), Anglesea, Cold Spring, Cape May Pt.

ISANTHUS Michaux.**Isanthus brachiatus (L.). False Pennyroyal.**

Trichostema brachiatum Linnæus, Sp. Pl. 598. 1753 [North America].

Isanthus cæruleus Willis 44.

Isanthus brachiatus Britton 203.—Keller and Brown 273.

Dry sandy ground; at several points along the Delaware above Trenton, also in Bergen and Monmouth Counties; rare and quite likely introduced, as it occurs along railroads in Pennsylvania.

Middle District.—Freehold (C).

TRICHOSTEMA L.**Trichostema dichotomum L. Blue Curls.**

Trichostema dichotomum Linnæus, Sp. Pl. 598 [Virginia and Pennsylvania].

Barton Fl. Phila. II. 40. 1818.—Britton 202.

Dry fields, etc., throughout the State, in many instances a weed in cultivated or waste ground.

Fl.—Mid-August to mid-September.

Middle District.—New Egypt, Hartford, Camden (T), Medford (S), Oaklyn (S), Washington Park, Lawnside (S), Lindenwold, Swedesboro.

Pine Barrens.—Speedwell (S), Pen Bryn (S), Atsion (S), Landisville (T), Egg Harbor City, Belleplain (S).

Coast Strip.—Barnegat City Inc. (L), Tucker's (L), West Creek (S), Atlantic City (S), Avalon.

Cape May.—Bennett (S), Cold Spring (S).

Trichostema lineare Nutt. Narrow-leaved Blue Curls.

Trichostema linearis Nuttall, Gen. II. 39. 1818 [New Jersey].—Barton Fl.

Phila. II. 40. 1818.—Knieskern 23.—Willis 44.—Britton 203.—Keller and Brown 274.

Locally in sandy ground of the Middle and Pine Barren districts; apparently not common.

Fl.—Mid-August to mid-September.

Middle District.—Hainesport, Camden, Griffith's Swamp (NB), Washington Park, Clementon.

Pine Barrens.—Monmouth and Ocean Cos. (C), Malaga (P), Quaker Bridge (C), Palermo (S), Seaville.

SCUTELLARIA L.*Key to the Species.*

a. Flowers 6–10 mm. long, in axillary or sometimes terminal racemes.

S. lateriflora, p. 665

aa. Flowers 12–30 mm. long, in terminal, often panicked, racemes.

b. Leaves, except the floral ones, broad, crenate or dentate.

S. pilosa, p. 665

bb. Leaves, all except the lowest, narrow entire. *S. integrifolia*, p. 665

aaa. Flowers 16–26 mm. long, solitary in the axils, leaves lanceolate, nearly sessile. *S. galericulata*, p. 666

Scutellaria lateriflora L. Mad-dog Scullcap.

Scutellaria lateriflora Linnæus, Sp. Pl. 598 [Canada and Virginia].—Knieskern 24.—Britton 201.

Common in wet shaded ground or along streams throughout the State, except in the Pine Barrens, where it does not occur.

Fl.—Early July to mid-September.

Middle District.—New Egypt, Fish House, Kaighns Pt., Medford (S), Oaklyn (S), Washington Park, Lawnside (S), Lindenwold (S), Bridgeport, Blackwood, Clementon (S), Swedesboro, Willow Grove, Salem.

Coast Strip.—Manahawkin.

Cape May.—Goshen (S), Court House (S), Dias Creek, Cold Spring, Green Creek (S).

Scutellaria pilosa Michx. Hairy Scullcap.

Scutellaria pilosa Michaux, Fl. Bor. Am. II. 11. 1803 [Carolina and Georgia].—Willis 46.—Britton 200.

Dry ground; rather frequent or occasional in the Middle and Cape May districts, ranging north to Hunterdon and Mercer Counties.

Fl.—Mid-June to mid-July.

Middle District.—Keyport (NB), Birmingham, Medford (S), Mickleton, Swedesboro, Union Grove (S), Fairton (S).

Cape May.—Cold Spring (S), Bennett.

Scutellaria integrifolia L. Hyssop Scullcap.

Scutellaria integrifolia Linnæus, Sp. Pl. 599. 1753 [Virginia and Canada].—Barton Fl. Phila. II. 39. 1818.—Knieskern 24.—Britton 200.

Common in moist ground throughout the State, except in the Pine Barrens, where it is only occasional.

Fl.—Mid-June to mid-July.

Middle District.—Keyport (NB), Farmingdale, New Egypt, Riverside, Hartford, Arney's Mt. (S), Albion, Locust Grove (S), Medford (S), Oaklyn (S), Washington Park, Lawnside (S), Repaupo, Sicklerville (S), Yorktown, Husted (S), Haleyville (NB).

Pine Barrens.—Williamstown Inc., Winslow Inc., Hammonton (Bassett).

Coast Strip.—Pt. Pleasant, Waretown, Forked River, Sherburn's (L), Cox's, Beesley's Pt. (S), Petersburg (S), Mays Landing (S).

Cape May.—Bennett (S), Cold Spring (S).

Scutellaria galericulata L. Marsh Scullcap.

Scutellaria galericulata Linnæus, Sp. Pl. 599. 1753 [Europe].—Nuttall Gen. II. 37. 1818.—Barton Fl. Phila. II. 38. 1818.—Britton 201.—Keller and Brown 275.

In wet ground in the northern counties and southward along the Delaware River, also at Cape May. The statement in Britton's Catalogue to the effect that it is "frequent in Atlantic County (Peters)" must be an error; there are no specimens in the State herbarium.

Fl.—Early June to late August.

Middle District.—Riverton (Bassett), Delanco, Cooper's Creek, Westville (KB), Repaupo, Swedesboro, Woodstown (KB).

Cape May.—Cape May (OHB).

AGASTACHE Clayton.**Agastache nepetoides (L.). Catnip Giant Hyssop.**

Hyssopus nepetoides Linnæus, Sp. Pl. 569. 1753 [Virginia and Canada].

Lophanthus nepetoides Willis 45.—Britton 200.

Agastache nepetoides Keller and Brown 275.

Locally on edges of woods in the northern counties; rare within our limits, in the upper Middle district only.

Fl.—Late July into September.

Middle District.—Freehold (C), Gloucester (KB), Pea-shore Camden (P).

Agastache scrophularifolia (Willd.). Giant Hyssop.

Hyssopus scrophularifolius Willdenow, Sp. Pl. III. 48. 1801 [Virginia and Canada].—Barton, Fl. Phila. II. 31. 1818.

Lophanthus scrophulariæfolius Britton 200.

Agastache scrophulariæfolia Keller and Brown 275.

Frequent on the edges of woods in the northern counties; rare southward in the Middle district.

Fl.—Late July into September.

Middle District.—Freehold (C), Camden.

PRUNELLA L.**Prunella vulgaris L. Self-heal.**

Prunella vulgaris Linnæus, Sp. Pl. 600. 1753 [Europe].

Brunella vulgaris Britton 201.

Frequent as a weed in cultivated ground and also in woods, etc., in remote sections, where it appears as if native. Original habitat not ascertainable.

Fl.—Early June into October.

STACHYS L.

Stachys hyssopifolia Michx. Hyssop Hedge Nettle.

Stachys hyssopifolia Michaux, Fl. Bor. Am. II. 4. 1803 [Carolina].—Willis 46.—Britton 202.—Keller and Brown 277.

Open wet ground in the Middle district; local.

Fl.—Late July to late August.

Middle District.—Florence, Delanco, Pemberton (NJ), Moorestown (KB), Camden (C), Medford (NB).

Pine Barrens?—Malaga (KB).

Stachys palustris L. Hedge Nettle.

Stachys palustris Linnæus, Sp. Pl. 580. 1753 [Europe].—Knieskern 24.—Britton 201.

Damp open ground, rare; known only from one locality in the Coast district, and possibly not native there.

Fl.—Mid-June to late July, probably.

Coast Strip.—Spray Beach (L).

Stachys aspera Mich. Rough Hedge Nettle.

Stachys aspera Michaux, Fl. Bor. Am. II. 5. 1803 [Carolina].—Barton, Fl. Phila. II. 33. 1818.—Britton 201.

Moist open ground of the Northern and Middle districts.

Fl.—Mid-June to late July, sporadically into September.

Middle District.—Atlantic Highlands (NB), New Egypt, Fish House, Washington Park, Center Square, Salem (S).

SALVIA L.

Salvia lyrata L. Lyre-leaved Sage.

Pl. CXXIII., Fig. 2.

Salvia lyrata Linnæus, Sp. Pl. 23. 1753 [Virginia].—Knieskern 23.—Britton 199.

Sandy ground; frequent in the Middle district north to Middlesex and Mercer Counties, and on the Coast strip south to Cape May.

Fl.—Mid-May to mid-June.

Middle District.—Farmingdale, New Egypt (NB), Pemberton (NB), Medford (S), Taunton (S), Washington Park, Camden (P), Lindenwold (S), Two miles east Sewell (S), Wenonah (S).

Coast Strip.—Pt. Pleasant (S), Atlantic City, Avalon, Piermont (S), Cold Spring (S), Cape May Court House.

MONARDA L.***Monarda fistulosa* L. Wild Bergamot.**

Monarda fistulosa Linnæus, Sp. Pl. 22. 1753 [Canada].—Britton 199.

In dry soil; locally in the northern counties; rare within our limits and confined to the Middle district.

Fl.—Early July to late August.

Middle District.—Keyport (C), Cassville.

***Monarda punctata* L. Horse-mint.**

Pl. CX.

Monarda punctata Linnæus, Sp. Pl. 22. 1753 [Virginia].—Pursh Fl. Am. Sept. I. 18. 1814.—Barton Fl. Phila. 14. 1818.—Knieskern 23.—Willis 45.—Britton 199.—Keller and Brown 278.

Common in dry, open, sandy ground of the Middle, Coast and Cape May districts north to Middlesex and Mercer Counties. Appears as a weed in many places, and the occurrences in the Pine Barrens seem to be of this nature.

This is one of the characteristic native plants of the Middle district which takes kindly to cultivation, increasing abundantly in fields, along roadsides, etc. While its flowers are handsome individually, the colors are too neutral and the pink bracts not bright enough to produce much effect in bulk.

Fl.—Late July into October.

Middle District.—New Egypt, New Lisbon, Camden, Medford (S), Mickleton, Blackwood, Clementon, Swedesboro.

Pine Barrens.—Speedwell (S), Landisville (T), Hammonton, Mouth of Batsto, Egg Harbor City.

Coast Strip.—Absecon (S), Atlantic City (S), Ocean City (S), Wildwood.

Cape May.—Cold Spring (OHB), Dias Creek, Cape May.

HEDEOMA Persoon.***Hedeoma pulegioides* (L.). Pennyroyal.**

Melissa pulegioides Linnæus, Sp. Pl. 593. 1753 [Virginia and Canada].

Hedeoma pulegioides Knieskern 23.—Britton 198.

Frequent in open dry ground or in woodland throughout the State, except in the Pine Barrens, where it is local and perhaps introduced, as it has a tendency to spread everywhere in cultivated ground.

Fl.—Late July to early September.

Middle District.—New Egypt, Oaklyn (S), Swedesboro, Camden (P).

Pine Barrens.—Cedar Brook, Egg Harbor City.

Cape May.—Cold Spring (OHB).

CLINOPODIUM L.

Clinopodium vulgare L.

Clinopodium vulgare Linnæus, Sp. Pl. 587. 1753 [Europe and Canada].

Calamintha clinopodium Knieskern 23.—Britton 198.

Dry ground, woods or thickets; frequent in the northern counties and less common southward in the Middle district; introduced as a weed into the Pine Barrens.

Fl.—Early July into September.

Middle District.—Ocean and Monmouth Cos. (Kn), New Egypt, Moorestown (C), Atco (C), Swedesboro.

Pine Barrens.—Landisville.

KOELLIA Moench.

Key to the Species.

- a.* Bracts and calyx teeth awn-tipped, rigid, as long as the corolla, flowers in dense heads, terminating the branchlets, leaves slightly petioled. *K. aristata*, p. 670
- aa.* Bracts and calyx teeth not long-awned.
 - b.* Leaves linear. *K. flexuosa*, p. 669
 - bb.* Leaves lanceolate.
 - c.* Leaves all glabrous or slightly pubescent on the nerves beneath. *K. virginiana*, p. 670
 - cc.* Leaves, at least the uppermost, closely pubescent above. *K. verticillata*, p. 670
 - bbb.* Leaves ovate or ovate oblong.
 - c.* Calyx and bracts with close minute appressed pubescence; leaves hoary with whitish wool beneath. *K. incana*, p. 671
 - cc.* Calyx and bracts pilose or hispid, with distant spreading hairs; leaves ovate, rigid, acute, rounded at base, green and glabrate when old; floral leaves, bracts and calyx teeth hoary. *K. mutica*, p. 671

Koellia flexuosa (Walt.). Narrow-leaved Mountain Mint.

Organum flexuosum Walter, Fl. Car. 165. 1788 [Carolina].

Dry rocky ground; frequent in the northern counties, but rare within our limits and confined to the upper Middle district and lower Cape May.

Fl.—Early July to late August.

670 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—Pt. Pleasant, New Egypt, Burlington, Swedesboro (CDL).

Cape May.—Cold Spring (S), Court House.

***Koellia virginiana* (L.). Virginia Mountain Mint.**

Satureja virginiana Linnæus, Sp. Pl. 567 [Virginia].

Pycnanthemum lanceolatum Barton, Fl. Phila. II. 35. 1818 (in part).

Pycnanthemum virginicum Britton 198.

Mainly dry ground; perhaps frequent in the northern counties; very rare within our limits. Known from one locality only in the Middle district.

Fl.—Early July to early September.

Middle District.—Kaighns Pt.

***Koellia verticillata* (Michx.). Torrey's Mountain Mint.**

Brachystemon verticillatum Michaux, Fl. Bor. Am. II. 6. pl. 31. 1803 [mountains of Pennsylvania and Upper Carolina].

Pycnanthemum Torreyi Britton 197.

Koellia verticillata Keller and Brown 280 (in part).

Frequent in low grounds of the northern and Middle districts southward to Salem County; occasional in the Pine Barrens.

Fl.—Early July to early September.

Middle District.—Farmingdale, Freehold (C), New Egypt, Kaighns Pt., Medford (S), Lawnside (S), Lindenwold, Salem Co. (KB), Swedesboro.

Pine Barrens.—Ancora, Piper's Corner (S), Elwood (C), Egg Harbor City (KB).

***Koellia aristata* (Michx.). Awned Mountain Mint.**

Pycnanthemum aristatum Michaux, Fl. Bor. Am. II. 8. pl. 33. 1803 [Maryland and Upper Carolina].—Knieskern 23.—Willis 45.—Britton 197.

Koellia aristata Keller and Brown 280.

Apparently restricted to the Central part of the Coast strip from Forked River to Absecon and on the outlying island; locally common. Although generally credited to the "Pine Barrens" we have been unable to find it away from the immediate vicinity of the coast.

Fl.—Early July to early September.

Coast Strip.—Ocean Co. (Kn), Waretown (C), Forked River, Manahawkin, Cox's, Beach Haven (L), Ship Bottom (L), North Beach Haven (L), Absecon.

Koellia incana (L.). Hoary Mountain Mint.

Clinopodium incanum Linnæus, Sp. Pl. 588. 1753 [N. Europe].

Pycnanthemum incanum Britton 197.

Open woods, rocky or sandy soil; frequent in the northern counties and locally and irregularly southward; apparently to some extent introduced in our territory.

Fl.—Early July to early September.

Middle District.—Griffith's Swamp, Mickleton (C), Bridgeton (C), Merchantville (C).

Pine Barrens.—Hammonton (Bassett), Quaker Bridge (P).

Cape May.—Cold Spring (OHB), Three miles west Court House (S).

Koellia mutica (Michx.). Short-toothed Mountain Mint.

Brachystemon muticum Michaux, Fl. Bor. Am. II. 6. pl. 32. 1803 [Upper Carolina].

Pycnanthemum muticum Britton 197.

Frequent in open sandy ground, mainly restricted to the Middle and Pine Barren districts, though it ranges northward along the Delaware and probably passes the fall line at other points in the northern counties.

Fl.—Early July to early September.

Middle District.—Farmingdale (NB), Pemberton Inc. (S), Camden, Had-donfield (P), Medford (NB), Mickleton.

Pine Barrens.—Cassville, Absecon, Atsion, Hammonton.

CUNILA L.**Cunila organoides (L.). Dittany.**

Satureja organoides Linnæus, Sp. Pl. 568. 1753 [Virginia].

Cunila mariana Britton 197.

Dry soil, usually in open woodland; common in the northern counties and locally frequent in the Middle and Cape May districts.

Fl.—Mid-August to late September.

Middle District.—Keyport (C), Mickleton (C), Mantua, Timber Creek near Gloucester (P), Swedes Bridge (C), Swedesboro (CDL), Bridgeton.

Cape May.—Bennett, Green Creek (S).

LYCOPUS L.

Key to the Species.

- a. Calyx-teeth ovate, scarcely acute, shorter than the mature nutlets.
 - b. Leaves mostly ovate, often purple, base of stem not tuberous. *Lycopus virginicus*, p. 672
 - bb. Leaves mostly lanceolate to oblong, base of stem tuberous. *L. uniflorus*, p. 672
- aa. Calyx-teeth lanceolate, subulate or very acute, larger than the nutlets.
 - b. Leaves deeply incised or pinnatifid. *L. americanus*, p. 673
 - bb. Leaves merely serrate.
 - c. Leaves sessile. *L. sessilifolius*, p. 672
 - cc. Leaves narrowed into a manifest petiole. *L. rubellus*, p. 673

Lycopus virginicus L. Purple Water Hoarhound or Bugle-weed.

Lycopus virginicus Linnæus, Sp. Pl. 21. 1753 [Virginia].—Knieskern 23.—Britton 196.

Moist ground; frequent in the Northern and Middle districts.
Fl.—Late July into September.

Middle District.—Long Branch, New Egypt, Medford (S), Oaklyn (S), Lawnside (S), Salem.

Pine Barrens.—Landisville (T), Atsion (S).

Lycopus uniflorus Michx. Common Water Hoarhound.

Lycopus uniflorus Michaux, Fl. Bor. Am. 14. 1803 [Lakes, St. John and Mistassini, Canada].

Moist ground; frequent in the Northern and Coast districts; apparently rare in the Middle district at least within our limits.

Fl.—Late July into September.

Middle District.—New Egypt, Clementon.

Coast Strip.—Cox's, Manahawkin, Barnegat City (L), Ship Bottom (L), Holgate's (L), Sherburn's (L).

Lycopus sessilifolius Gray. Sessile-leaved Water Hoarhound.

Lycopus europæus var. *sessilifolius* Gray, Man. Ed. 5. 345. 1867 [Atsion Creek, N. J.]—Willis 44.—Britton 196.—Keller and Brown 280.

Common in the Pine Barrens and frequent elsewhere throughout our region, but apparently not recorded in the State north of our limits.

This is the typical Hoarhound of the Pine Barrens common about the Cranberry bogs and other wet spots, always with abundantly-developed stolons. The type specimen was collected

by the late William M. Canby on Atsion Creek, in the heart of the Pines, that he was so fond of exploring.

Fl.—Early August into October.

Middle District.—Delanco (S), Fish House, Oaklyn (S), Swedesboro (CDL), Pennsgrove (NB), Salem (S), Dividing Creek.

Pine Barrens.—Como, Toms River (KB), Forked River, West Creek (S), Speedwell (S), Clementon (S), Atsion (C), Parkdale, Batsto, Green Bank (C), Egg Harbor City (KB), Mays Landing, Palermo (S), Seaville (S), Ocean City Inc., Petersburg (S).

Coast Strip.—Seaside Park, Barnegat City (L).

Cape May.—Bennett, Cape May, Cape May Pt. (S).

***Lycopus rubellus* Moench. Stalked Water Hoarhound.**

Lycopus rubellus Moench, Meth. Suppl. 146. 1802 [No loc., prob. Virginia] —Britton 196.—Keller and Brown 281.

Apparently rare. I am, however, by no means certain that the plant referred to is certainly distinct from *L. sessilifolius*. The example from Cape May shows short petioled leaves, but one from Forked River is nearly as much petioled. The sepals, too, are nearly glabrous, while in *sessilifolius* they are usually hispid.

Cape May.—Cape May.

***Lycopus americanus* Muhl. Cut-leaved Water Hoarhound.**

Lycopus americanus "Muhlenberg," Barton, Fl. Phila. Prodr. 15. 1815 [Canada].

Lycopus sinuatus Willis 44.—Britton 196.

Moist ground; frequent or common throughout the State, except in the Pine Barrens, where it is conspicuous by its absence. Especially abundant on the coast strip.

Fl.—Mid-July into September.

Middle District.—New Egypt, Florence, New Lisbon, Delanco (S), Camden, S. Westville, Swedesboro, Millville.

Coast Strip.—Seaside Park, Waretown, N. Beach Haven (L), Peahala (L), Spray Beach (L), Atlantic City (S), Beesley's Pt. (S), Ocean City (S), Palermo (S), Mays Landing (S), Seaville, Piermont (S), Court House (S), Cold Spring (S).

Cape May.—Dennisville (S); E. of Dias Creek (S).

MENTHA L.

Key to the Species.

- a. Whorls of flowers axillary only. *M. canadensis*, p. 674
- aa. Whorls of flowers forming terminal spikes.
 - b. Plants glabrous or nearly so.

- c. Spikes slender, mostly interrupted, leaves sessile or nearly so. [M. spicata]*
- cc. Spikes shorter and denser, leaves petioled. [M. piperita]†
- bb. Plants villose, hirsute or canescent.
- c. Leaves lanceolate, acute. [M. longifolia]‡
- cc. Leaves elliptic, obtuse. [M. rotundifolia]§

Mentha canadensis L. Wild Mint.

Mentha canadensis Linnæus, Sp. Pl. 577. 1753 [Canada].—Britton 196.

Common in open moist ground in the northern counties and less common southward in the Middle and Coast districts.

Fl.—Early July into September.

Middle District.—Fish House, Medford (S), Washington Park, Mickleton, Swedesboro, Woodstown (NB).

Coast Strip.—Spray Beach (L).

COLLINSONIA L.

***Collinsonia canadensis* L.**

Collinsonia canadensis Linnæus, Sp. Pl. 28. 1753 [Virginia and Canada].—Knieskern 23.—Britton 195.

Frequent in woods of the northern counties; rare southward within our limits.

Fl.—Early August to late September.

Middle District.—New Egypt, Mantua, Swedesboro (CDL).

Family SOLANACEÆ. Potatoes, Groundcherries, etc.

- a. Fruit a prickly capsule, flowers long funnel-form, 70–90 mm. long. Rank herbs 3–15 dm. high.
- b. Corolla white. [Datura stramonium]¹
- bb. Corolla violet purple. [D. tatula]²
- aa. Fruit a berry.
- b. Fruiting calyx enlarged, bladder-like, completely enclosing the berry. *Physalis*, p. 675
- bb. Calyx not enlarged.
- c. Climbing vine with purple flowers and red berries.

[*Solanum dulcamara*]³

* Spear Mint, abundantly introduced in meadows.

† Pepper Mint, locally introduced.

‡ Horse Mint, waste ground, very rare.

§ Round-leaved Mint, waste ground.

Several other species of Mint are introduced in various parts of the country.

¹ Jimson Weed, an abundant weed.

² Purple Jimson, less frequent.

³ Nightshade, in thickets, often appearing like a native.

cc. Erect herbs with white or whitish flowers.

d. Plant prickly, berries yellow.

[*S. carolinense*]⁴

dd. Plant not prickly, berries black.

S. nigrum, p. 675

PHYSALIS L.

Physalis heterophylla Nees. Ground Cherry.

Physalis heterophylla Nees. Linnaea VI. 463. 1831 [North America, probably Pennsylvania].

Dry open ground; frequent throughout the State, except in the Pine Barrens, where it is local. This and several other species are credited to our region, but they are all so generally weeds that it is impossible to determine if they are native here and, if so, what their original distribution may have been.

SOLANUM L.

Solanum nigrum L. Black Nightshade.

Solanum nigrum Linnæus, Sp. Pl. 186. 1753 [throughout world].—Britton 181.

Generally distributed, but such a universal weed that all trace of its original habitat has been lost. The introduced *S. dulcamara* (Purple Nightshade or Bitter Sweet) is perfectly naturalized along the coastal islands, where it is as characteristic as some of the native species.

Family SCROPHULARIACEÆ. Figwort, etc.

Key to the Species.

- a. Corolla rotate, anther-bearing stamens 5.
 - b. Plant densely wooly, flowers yellow, in a dense terminal spike. [*Verbascum thapsus*]¹
 - bb. Plant glabrous, flowers in a slender raceme, white or yellow, stamens purplish. [*V. blattaria*]²
- aa. Corolla various, anther-bearing stamens 2 or 4.
 - b. Corolla spurred at the base.
 - c. Flowers 25–30 mm. long, yellow and orange. [*Linaria linaria*]³
 - cc. Flowers 6–12 mm. long, blue. *L. canadensis*, p. 677
 - bb. Corolla not spurred.
 - c. Anther-bearing stamens 2.
 - d. Dwarf aquatic plants with inconspicuous axillary flowers and opposite, entire rounded leaves. *Micranthemum*, p. 681

⁴ Horse Nettle, a bad weed in fields, etc.

¹ Mullein, a common field weed occurring with the next.

² Moth Mullein.

³ Toad-flax, a frequent weed on roadsides and waste ground.

- dd. Tall herbs 6-20 dm. high, with dense terminal spike-like racemes of tubular white flowers (4 mm. long).
Leptandra virginica, p. 683
- ddd. Low herbs, not over 6 dm. high.
- e. Flowers somewhat tubular, limb two-lipped.
- f. Two protruding sterile stamens in addition to those bearing anthers.
- g. Peduncles long and filiform, exceeding the subtending leaves. *I. anagallidea*, p. 681
- gg. Peduncles as long as the leaves, or shorter.
Ilysanthes dubia, p. 680
- ff. Sterile filaments, short or none.
- g. Flowers bright yellow. *Gratiola aurea*, p. 680
- gg. Flowers white or tinged with yellow or purple.
- h. Plant hirsute, flowers 8 mm. long.
G. pilosa, p. 680
- hh. Plant glabrous, flowers 14 mm. long.
G. sphærocarpa, p. 679
- hhh. Plant glandular, puberulent, flowers 8-10 mm. long.
G. virginiana, p. 679
- ee. Flowers rotate, divisions nearly equal, not 2-lipped.
Veronica, p. 682
- cc. Anther bearing stamens 4.
- d. Terrestrial herbs with conspicuous flowers.
- e. Flower heads appearing scarlet, but color really restricted to the foliaceous bracts, flowers greenish yellow.
Castilleja, p. 687
- ee. Flowers blue or violet, 25 mm. long, plants glabrous.
- f. Leaves sessile, peduncles longer than the calyx.
Mimulus ringens, p. 679
- ff. Leaves petioled, peduncles shorter than the calyx.
M. alatus, p. 679
- eee. Flowers pink or purple.
- f. Plant hispid, flowers salverform, purple, 25 mm. long, the limb nearly equally 5-parted, in a terminal bracted spike.
Buchnera, p. 683
- ff. Plants glabrous, with opposite sessile linear leaves, flowers bell-shaped, pink or purplish, pedicelled, 10-25 mm. long.
Gerardia, p. 685
- eeee. Flowers yellow.
- f. Similar to those of *Gerardia*, 25-35 mm. long.
Dasystoma, p. 684
- ff. Strongly 2-lipped, somewhat compressed, 15-20 mm. long.
- g. Plant glabrous, 3-9 dm. high, leaves pinnately lobed.
Pedicularis lanceolata, p. 687
- gg. Plant pubescent, at least above, 1.5-4.5 dm. high, leaves pinnately parted.
P. canadensis, p. 688

eeee. Flowers white.

f. Corolla 25 mm. long, inflated and contracted at the mouth, plant glabrous. *Chelone*, p. 678

ff. Corolla 20 mm. long, not contracted at the mouth, often tinged with purple, stem hairy.

Penstemon hirsutus, p. 678

fff. Corolla 8-12 mm. long, two-lipped, lower lip yellow, plant puberulent, 2-5 dm. tall.

Melampyrum lineare, p. 688

cecece. Flowers purplish or yellowish green, sometimes almost brown, or partly yellow, partly maroon.

f. Flowers 6-8 mm. long, numerous in large, nearly leafless thyrses, plant 1-3 m. tall, glabrous below, somewhat glandular above, leaves opposite.

g. Corolla dull outside, sterile stamen purple.

Scrophularia marilandica, p. 678

gg. Corolla shining outside, sterile, stamens greenish yellow.

S. leporella, p. 678

ff. Flowers laterally compressed, irregular, 2-lipped, 25-40 mm. long, in a bracted spike; plant pubescent, 3-6 dm. high, leaves alternate.

Schwalbea, p. 687

dd. Low succulent aquatic plant, creeping on mud or floating, with slender obtuse leaves 20-120 mm. long, and 1-flowered peduncles, corolla white or pinkish, 2 mm. broad.

Limosella, p. 681

LINARIA Hill.

Linaria canadensis (L.). Blue Toad-flax.

Antirrhinum canadense Linnæus, Sp. Pl. 618. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 44. 1818.

Linaria canadensis Knieskern 22.—Britton 183.

Open, sandy ground; common throughout our region and in parts of the northern counties; frequently a weed in cultivated and waste ground.

Fl.—Late April to early July.

Middle District.—New Egypt, Burlington, Camden, Medford (S), Washington Park, Mantua, Westville, Mickleton, Swedesboro.

Pine Barrens.—Brown's Mills, Forked River, Atco, Landisville, Head of Batsto.

Coast Strip.—Seaside Park, Surf City (L), Beach Haven Terrace (L), Atlantic City.

Cape May.—Cape May.

* Knieskern's record of *Physostegia virginica* in Monmouth and Ocean counties (p. 24), cannot be verified. The plant has escaped from cultivation farther south and perhaps his record is of this sort.

SCROPHULARIA L.

***Scrophularia marilandica* L. Maryland Figwort.**

Scrophularia marilandica Linnæus, Sp. Pl. 619. 1753 [Virginia].

Scrophularia nodosa var. *Marylandica* Britton 184.

Scrophularia nodosa Knieskern 22.

Open woods and thickets; frequent in the northern counties and south casually in the Middle district, especially along the Delaware.

Fl.—Early July to late August.

Middle District.—Ocean and Monmouth Cos. (Kn), Fish House, Camden (CP), Salem Co.

***Scrophularia leporella* Bicknell. Hare Figwort.**

Scrophularia leporella Bicknell, Bull. Torr. Bot. Cl. 23: 317. 1896 [Near N. Y. City].

Open woods and thickets; frequent in the northern counties and southward along the Delaware and on the Coastal strip.

Fl.—Late May to early July.

Middle District.—Fish House, Washington Park, Woodbury.

Coast Strip.—Spray Beach (L), Piermont.

CHELONE L.

***Chelone glabra* L. Snakehead, Turtlehead.**

Pl. CXI.

Chelone glabra Linnæus, Sp. Pl. 611. 1753 [Virginia and Canada].—Knieskern 22.—Britton 184.

In open swamps; common in the Northern and Middle districts and occasional on the Cape May peninsula.

Fl.—Late August to late September.

Middle District.—New Egypt, Burlington, Hartford, Birmingham, Delair, Kaighns Pt., Medford (S), Washington Park, Ashland.

Cape May.—Seaville (S), Cold Spring (S).

PENSTEMON Solander.

***Penstemon hirsutus* (L.). Hairy Beard Tongue.**

Chelone hirsutum Linnæus, Sp. Pl. 611 [Virginia].

Penstemon pubescens Willis 42.

Rocky situations; frequent in the northern counties and occasional within our limits in sandy fields of the Middle district, where it is probably introduced as a weed.

Fr.—Late May to late June.

Middle District.—New Egypt, Kirkwood (C), Mickleton (C).

MIMULUS L.

Mimulus ringens L. Common Monkey Flower.

Mimulus ringens Linnæus, Sp. Pl. 634 [Virginia and Canada].—Knieskern 22.—Britton 185.

Open swamps; frequent in the Northern and Middle districts and locally on the Cape May peninsula and Coast strip.

Fl.—Early July to late August, sporadically into September.

Middle District.—New Egypt, Pemberton (S), Delaire, Camden (C), Medford, Mickleton (C), Atco (C), Swedesboro, Dividing Creek.

Coast Strip.—Manahawkin, Mays Landing, Wildwood Jnc., Dias Creek, Cape May (S), Cape May Court House.

Mimulus alatus Soland. Wing-stemmed Monkey Flower.

Pl. CXIX., Fig. 2.

Mimulus alatus Solander in Aiton's Hort. Kew. II. 361. 1789 [North America].—Knieskern 22.—Britton 185.—Keller and Brown 288.

Rare and local in open swamps or meadows of the Northern and Middle districts.

Fl.—Early July to late August, sporadically into September.

Middle District.—New Egypt, Crosswicks Creek (C), Delair, Medford, Woodstown (KB).

GRATIOLA L.

Gratiola virginiana L. Clammy Hedge Hyssop.

Gratiola virginiana Linnæus, Sp. Pl. 17. 1753 [Virginia].—Knieskern 22.—Britton 185.

Damp or muddy spots; locally distributed through the Northern and Middle districts.

Fl.—Late May to late July.

Middle District.—Farmingdale (S), New Egypt, Medford (S), Washington Park, Andrews, Swedesboro, Riddleton.

Gratiola sphærocarpa Ell. Round-fruited Hedge Hyssop.

Gratiola sphærocarpa Elliott, Bot. S. C. and Ga. I. 14. 1816 [Four miles from Charleston, S. C., on the neck].—Willis 42.—Britton 185.—Keller and Brown 289.

Wet muddy spots in the Middle and Cape May districts, reaching here, the northern limit of its distribution; rare and local.

Originally collected in the State by Austin at Dennisville, Cape May County, May, 1855.

Middle District.—Burlington.

Cape May.—Ocean View (NB), Opp. Cold Spring, Cape May (P), Dennisville (P).

***Gratiola aurea* Pursh. Golden Hedge Hyssop.**

Gratiola aurea Pursh, Fl. Am. Sept. I. 12. 1814 [Pine Barrens of N. England, New Jersey and Carolina].—Knieskern 22.—Willis 42.—Britton 186.—Keller and Brown 289.

Common in wet sandy ground throughout the Pine Barrens south to Dennisville, also locally in the Middle district and up the Delaware to Belvidere, also on the shores of Lake Hopatcong and Green Pond.

Fl.—Late June to late September.

Middle District.—Florence Hts., Delanco, Fish House, Gloucester, Paulsboro, Center Square.

Pine Barrens.—Pt. Pleasant, Toms River, Forked River, Manahawkin, Cedar Grove (S), Cedar Bridge, West Creek, Landisville, Winslow, Hamonton, Atsion (S), Batsto, Egg Harbor City, Woodbine, Dennisville (S).

***Gratiola pilosa* Michx. Hairy Hedge Hyssop.**

Gratiola pilosa Michaux, Fl. Bor. Am. I. 7. 1803 [Carolina].—Willis 42.—Britton 186.—Keller and Brown 289.

Damp ground and edges of salt marshes in the Cape May and lower Middle districts, reaching here, the northern limit of its distribution.

Collected at Griffith's Swamp, near Haddonfield, by Diffenbaugh in 1862.

Fl.—Early July to early September.

Middle District.—Four miles east of Camden, Griffith's Swamp, Dividing Creek.

Cape May.—Court House, Two miles west of Court House (S), Three miles west of Court House (S), Bennett, Cold Spring, Green Creek, Cape May.

ILYSANTHES Rafinesque.

***Ilysanthes dubia* (L.). Short-stalked False Pimpernel.**

Gratiola dubia Linnæus, Sp. Pl. 17. 1753 [Virginia].

Wet ground in the northern counties, ranging down the Delaware into the Middle district. Not found elsewhere within our limits.

Fl.—Early July to early September.

Middle District.—Riverside, Kaighns Pt., Swedesboro.

Ilysanthes anagallidea (Michx.)* Long-stalked False Pimpernel.

Gratiola anagallidea Michaux, Fl. Bor. Am. I. 6. 1803 [Carolina].

Ilysanthes gratioloides Knieskern 22.—Britton 186.

Lindernia attenuata Barton, Fl. Phila. I. 8. 1818.

Frequent in wet places throughout the Middle and Cape May districts and along the Coast strip; probably does not range much above the fall line in the northern counties.

Fl.—Early July to early September.

Middle District.—Crosswicks, Florence Hts., Jackson, Clementon, Woodbine (S).

Coast Strip.—N. Spring Lake (NB), St. Albans (L), N. Beach Haven (L), Spray Beach (L), Beach Haven (L), Ocean City (S).

Cape May.—Rio Grande, Nummeytown (S).

MICRANTHEMUM Michaux.

Micranthemum micranthemoides (Nutt.). Nuttall's *Micranthemum*.

Hemianthus micranthemoides Nuttall, Jour. Acad. Nat. Sci. Phila. I. 119, pl. 6. 1817 [Kensington (now in Philadelphia) on the Delaware River].

Micranthemum micranthemoides Keller and Brown 289.

Micranthemum Nuttallii Willis 43.—Britton 186.

Muddy shores of the Delaware from Camden to Burlington; local.

Fl.—Early September into November.

Middle District.—Burlington, Delair, Morris, Camden.†

LIMOSELLA L.

Limosella tenuifolia Hoffm. Narrow-leaved Mudwort.

Pl. XC., Fig. 1.

Limosella tenuifolia Hoffman, Deutsch. Fl. 29. 1804 [Germany].—Keller and Brown 290.

Limosella aquatica var. *tenuifolia* Willis 43.—Britton 186.

Muddy shores of the Delaware and edges of the salt marshes from Long Branch to St. Albans.

Fl.—Early June into September.

* cf. Robinson *Rhodora* 1908, 66, on nomenclature of species.

† The record in Keller and Brown's list for Clementon (Jahn) cannot be substantiated and is almost certainly based upon a misidentification.

Middle District.—Burlington, Shore of Delaware River.

Coast Strip.—Long Branch (C), Lake Como (S), Spring Lake (NB), Sea Girt, Bay Head, St. Albans (L), Spray Beach (L), Holgate's (L).

VERONICA L.

Key to the Species.

- a. Flowers racemose in the axils of the leaves.
 - b. Plants glabrous or slightly glandular, flowers blue.
 - c. Leaves ovate or oval, petioled. *V. americana*, p. 682
 - cc. Leaves linear or linear lanceolate. *V. scutellata*, p. 682
 - bb. Plants pubescent, leaves oval or obovate, petioled, flowers pale blue. *V. officinalis*, p. 683
- aa. Flowers in terminal spikes or racemes, pale blue with darker stripes. Stems decumbent, leaves opposite, oval, 6–12 mm. long. *V. serpyllifolia*, p. 683
- aaa. Flowers solitary in the axils. Plant 7–30 cm. high.
 - b. Erect glabrous or glandular, leaves oblong, 6–20 mm. long, flowers white. *V. peregrina*, p. 683
 - bb. Much branched and diffuse, leaves ovate or oval, crenate, 4–12 mm. long, flowers blue to nearly white. [*V. arvensis*]*

Veronica americana Schw. Brooklime.

Veronica americana "Schw." Benth in D. C. Prodr. X. 468. 1846 [Canada and Carolina to Oregon].—Knieskern 23.—Willis 43.—Britton 187.

In streams; frequent in the northern counties and occasional within our limits in the Middle district.

Fl.—Early June to early August.

Middle District.—New Egypt (C), Burlington, Swedesboro.

Veronica scutellata L. Marsh Speedwell.

Veronica scutellata Linnaeus, Sp. Pl. 12. 1753 [Europe].—Britton 187.—Keller and Brown 290.

Frequent or occasional in swamps of the Northernmost counties, also at Princeton Junction, Black Swamp, Somerset County and Rosemont, Hunterdon County; and at one or two stations near Camden, where it is now probably extinct.

Fl.—Early May to late August.

Middle District.—Cooper's Ferry, Whiskey Road.

* Corn Speedwell a common weed.

Veronica officinalis L. Common Speedwell.

Veronica officinalis Linnæus, Sp. Pl. 11. 1753 [Europe].—Britton 187.

Dry ground; frequent in the Northern and Middle districts and occasional on the coast and lower bay shore. Appearing like a weed in some places.

Fl.—Early May to late July.

Middle District.—Washington Park, Mickleton, Swedesboro.

Coast Strip.—Barnegat City (L).

Cape May.—Town Bank.

Veronica serpyllifolia L. Thyme-leaved Speedwell.

Veronica serpyllifolia Linnæus, Sp. Pl. 12. 1753 [Europe and America].—Knieskern 23.—Britton 187.

Open ground in the Northern and Middle districts.

Fl.—Late April to early July.

Middle District.—New Egypt, Kinkora, Mickleton.

Veronica peregrina L. Purslane Speedwell.

Veronica peregrina Linnæus, Sp. Pl. 14. 1753 [Europe].—Britton 187.

Common or occasional throughout the State, usually in cultivated or waste ground, occurring as a weed.

Fl.—Late April to late June.

Middle District.—New Egypt, Sewell (S), Washington Park, Swedesboro.

Pine Barrens.—Landisville.

Coast Strip.—Beach Haven (L).

Cape May.—Cape May (S).

LEPTANDRA Nutt.**Leptandra virginica (L.). Culver's Root.**

Veronica virginica Linnæus, Sp. Pl. 9. 1753 [Virginia].—Willis 43.—Britton 186.

In low ground; frequent in the northern counties; very rare within our limits and confined to the Middle district.

Fl.—Early July to late August.

Middle District.—Prosperstown, Monmouth Co. (Willis).

BUCHNERA L.**Buchnera americana L. Blue Hearts.**

Buchnera americana Linnæus, Sp. Pl. 630. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 217. 1818.—Britton 188.—Keller and Brown 291.

Very rare; known from but one station in the State, near Burlington, where it is now probably extinct. This marked the northern limit of its range east of the Alleghanies. Barton mentions that it was found by Zaccheus Collins in sandy ground in New Jersey, but whether he referred to the above locality cannot be determined.

Middle District.—Burlington.

DASYSTOMA Rafinesque.

Key to the Species.

- a. Plant glandular pubescent, much branched, leaves finely pinnatifid. *D. pedicularia*, p. 684
- aa. Plant cinereous puberulent, strict and simple, leaves oblong or lanceolate entire or the lowest toothed. *D. flava*, p. 684
- aaa. Glabrous and glaucous, branched, upper leaves entire, the lower 1-2 pinnatifid. *D. virginica*, p. 685

Dasytoma pedicularia (L.). Fern-leaved False Foxglove.

Gerardia pedicularia Linnæus, Sp. Pl. 611. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 46. 1818.—Knieskern 23.—Britton 189.

Frequent or occasional in dry woods throughout the State, most common in the Pine Barrens.

Fl.—Mid-August to mid-September.

Middle District.—Middletown.

Pine Barrens.—Brindletown, Bamber, Taunton (S), Williamstown Inc. (S), Cedar Grove (S), Hammonton.

Cape May.—Cold Spring (OHB).

Dasytoma flava (L.). Downy False Foxglove.

Gerardia flava Linnæus, Sp. Pl. 610. 1753 [Virginia and Canada].—Willis 43.—Britton 189.

Dry woodland; frequent throughout the State, but apparently less abundant in the Pine Barrens.

Fl.—Early July to early August.

Middle District.—Leedsville (NB), Farmingdale, Hornerstown, Medford (S), Swedesboro, Fairton (S).

Pine Barrens.—Williamstown Inc. (S), Winslow (S), Hammonton (T).

Cape May.—Court House (S), Whitesboro (S), Bennett (S), Cold Spring (OHB), Cape May.

Dasystema virginica* (L.). Smooth False Foxglove.Rhinanthus virginicus* Linnæus, Sp. Pl. 603. 1753 [Virginia].*Gerardia quercifolia* Barton, Fl. Phila. II. 46. 1818.—Knieskern 23.—Britton 189.

Occasional in the northern counties, but very rare within our limits and known from but three stations. The statement in Britton's Catalogue and in Keller and Brown's List to the effect that it is "frequent in the middle and southern counties" is certainly incorrect.

Fl.—Mid-August to mid-September.*Middle District.*—New Egypt, Fairton.*Pine Barrens?*—Hammonton (NB).**GERARDIA L.***Key to the Species.*

- a.* Pedicels little, if at all, longer than the calyx and capsule.
 - b.* Flowers large, corolla 23–31 mm. long.
 - c.* Leaves linear 1.5–3.5 mm. wide. *G. purpurea*, p. 685
 - cc.* Leaves filiform .05–1.5 mm. wide, often curled. *G. racemulosa*, p. 686
 - bb.* Flowers smaller, corolla 14–18 mm. long. *G. maritima*, p. 685
- aa.* Pedicels usually exceeding the corolla, corolla 12–20 mm. long.
 - b.* Leaves linear, 2.5 mm. wide or less. *G. tenuifolia*, p. 686
 - bb.* Leaves filiform, less than 1 mm. wide. *G. setacea*, p. 686

***Gerardia maritima* Raf. Salt Marsh *Gerardia*.**

Gerardia maritima Rafinesque, Med. Rep. II. 5. 361. 1808 [Islands of Egg Harbor, N. J].—Nuttall, Gen. II. 46. 1818.—Knieskern 23.—Willis 43.—Britton 188.—Keller and Brown 292.

Salt marshes along the coast; common.

Fl.—Mid-July to mid-September.

Coast Strip.—Long Branch, Forked River, Barnegat Pier, Barnegat City (L), St. Albans (L), Spray Beach (L), Manahawkin, Atlantic City, Ocean City, Palermo, Sea Isle City, Piermont, Holly Beach, Cold Spring, Cape May.

***Gerardia purpurea* L. Large Purple *Gerardia*.**

Pl. CVII., Fig. 1.

Gerardia purpurea Linnæus, Sp. Pl. 610. 1753 [Virginia and Canada].—Knieskern 23.—Britton 188.

Low ground; common throughout the Middle, Coast and Cape May districts, and frequent in the northern counties, according to Britton's Catalogue.

A conspicuous flower in late summer and early autumn all along the coast strip, and in West Jersey. Its purple cups mingle with the yellow *Euthamia* and the white *Eupatoriums*, which abound at that season, in every piece of low moist ground.

Fl.—Late August to late September.

Middle District.—Burlington, Delair, Haddonfield (S), Orchard (S), Medford (S), S. Westville, Swedesboro, Dividing Creek.

Coast Strip.—Deal, Seaside Park, Waretown, Barnegat City (L), Spray Beach (L), Manahawkin, Cox's, West Creek (S), Absecon, Atlantic City, Ocean City, Seaville (S), Sea Isle City (S), Wildwood.

Cape May.—Cold Spring, Cape May, Bennett, Dias Creek (S).

***Gerardia racemulosa* Pennell. Pine Barren *Gerardia*.**

Gerardia racemulosa Pennell, Torreyia 1911. 15 [Parkdale, N. J.].

Pine Barren bogs; rather frequent, replacing the broader leaved *G. purpurea*.

This species seems to bear to *G. purpurea* the same relationship that *G. holmiana* does to *G. tenuifolia*, both the filiform leaved species being mainly or entirely restricted to the Pine Barrens.

Fl.—Late August to late September.

Pine Barrens.—Hornerstown, Forked River, Egg Harbor City, Cedar Grove to Jones' Mill (S), Parkdale.

***Gerardia tenuifolia* Vahl. Slender *Gerardia*.**

Gerardia tenuifolia Vahl. Symb. Bot. III. 79. 1794 [North America].—Knieskern 23.—Britton 188.

Dry open woods of the Northern, Middle and Cape May districts; most frequent northward.

Fl.—Mid-July to early October.

Middle District.—New Egypt, Westmont (S), Oaklyn (S), Mickleton, Swedesboro.

Cape May.—Bennett, Cold Spring (S).

***Gerardia holmiana*. Bristle-leaved *Gerardia*.**

Gerardia Holmiana Greene, Pittonia IV. 52. 1899 [Brookland, D. C.].—Keller and Brown 292.

Gerardia Skinneriana Keller and Brown 292 (as to N. J.).

Frequent throughout the Pine Barrens in dry sand. This is possibly the *G. setacea* of Walter, but as I cannot be certain I prefer to use Greene's name, as his types have been examined

by Mr. F. W. Pennell, who is familiar with our plant and assures me that they are identical.

Fl.—Mid-August to mid-September.

Middle District.—Orchard (S).

Pine Barrens.—Middletown, Woodmansie, Cedar Grove (S), West Creek (S), Jackson, Egg Harbor City, Quaker Bridge (C), Absecon, Seaville (S).

CASTILLEJA Mutis.

Castilleja coccinea (L.). Painted Cup.

Bartsia coccinea Linnæus, Sp. Pl. 602. 1753 [Virginia and New York].

Castilleja coccinea Britton 189.—Keller and Brown 292.

Low meadows; frequent in the northern counties, but rare and local in Mercer, Union and Somerset Counties and southward in the Middle district.

Fl.—Early May to early June, sporadically into July.

Middle District.—Monmouth Co. (Willis), White House (C), Hurffville (C), Lindenwold.

SCHWALBEA L.

Schwalbea americana L. Chaff-seed.

Schwalbea americana Linnæus, Sp. Pl. 606. 1753 [North America].—Pursh, Fl. Am. Sept. II. 428.—Barton, Fl. Phila. II., 218. 1818.—Willis 43.—Britton 189.—Keller and Brown 293.

Damp sandy spots in the Pine Barrens, local and not common, and very rare in the Middle district. Barton states that Zaccheus Collins found it within ten miles of Philadelphia. When in full bloom the flowers are quite handsome, pale lemon yellow and dark maroon.

Fl.—Early June to early July.

Middle District.—Near Burlington.

Pine Barrens.—Pt. Pleasant, Two miles north of Speedwell (S), Williamstown Inc. (Leeds), Waterford (P), Winslow Inc., Hammonton (Leeds), Egg Harbor City.

PEDICULARIS L.

Pedicularis lanceolata Michx. Swamp Lousewort.

Pedicularis lanceolata Michaux, Fl. Bor. Am. II. 18. 1803 [Illinois].—Willis 44.—Britton 190.—Brown and Keller 293.

Pedicularis pallida Nuttall, Gen. II. 50. 1818.—Barton, Fl. Phila. II. 46. 1818.

Open swamps; frequent in the northern counties and locally in the Middle and Cape May districts.

Fl.—Late August to late September or into October.

Middle District.—Freehold (C), New Egypt, Bordentown (C), Medford, Lindenwold, Woodstown (KB).

Cape May.—Court House (OHB), Cold Spring.

***Pedicularis canadensis* L. Lousewort. Wood Betony.**

Pedicularis canadensis Linnæus, Mantissa 86. 1767 [North America].—Knieskern 23.—Britton 189.

Dry open woods; frequent in the northern counties and locally southward in the Middle and Cape May districts.

Fl.—Late April to late May.

Middle District.—Farmingdale, New Egypt, Birmingham, Medford (S), Mickleton, Glassboro (S), Swedesboro, Centerton (S).

Cape May.—Anglesea Jnc. (3), Cold Spring (OHB), Cape May.

MELAMPYRUM L.

***Melampyrum lineare* Lam. Narrow-leaved Cow-wheat.**

Melampyrum lineare Lamarck, Encyc. IV. 22. 1797 [Carolina].—Britton 190.

Melampyrum Americanum Knieskern 23.

Common in dry woods, probably throughout the State, but we have no records from the Cape May peninsula.

A broad leaved form (*M. latifolium* Barton?) is perhaps distinct. At Medford it blooms two weeks earlier than the narrow-leaved plant, but there do not seem to be any very constant structural differences.

Fl.—Late May—late August.

Middle District.—Farmingdale, New Egypt, Smithville, Arney's Mt. (S), Fish House, Springdale (S), Medford, Washington Park, Sicklerville, Sewell (S), Glassboro (S).

Pine Barrens.—Asbury Park, Lakehurst, Forked River, Manahawkin, Cedar Grove (S), Speedwell, White Horse (S), Braddock's Mill (S), Berlin, Williamstown Jnc. (S), Landisville, Winslow Jnc., Hammonton (Bassett), Batsto (NB), Pleasant Mills (S), Manumuskin.

Family LENTIBULARIACEÆ. Bladderworts.

UTRICULARIA L.

a. Scapes erect, rooting in the mud, bladders few or none.

b. Flowers purple, solitary.

Utricularia resupinata, p. 690

bb. Flowers yellow, 1-10.

c. Scape rather stout, strict.

- d. Flowers 16-20 mm. broad. *U. cornuta*, p. 689
- dd. Flowers 8-10 mm. broad. *U. juncea*, p. 690
- cc. Scape filiform, zig-zag. *U. subulata*, p. 691
- bbb. Corolla included in the calyx or absent.
 - c. Flowers 2-6, capsule 1.5-2 mm. in diameter, plant 2-20 cm. high. *U. virgatula*, p. 690
 - cc. Flowers 1-2, about the size of a pin head, plant 2-5 cm. high. *U. cleistogama*, p. 691
- aa. Branches or finely divided leaves floating or creeping on mud and bearing numerous bladders.
 - b. Scape bearing a whorl of leaves with inflated petioles, flowers yellow. *U. inflata*, p. 693
 - bb. Scape leafless or with a few minute scales.
 - c. Leaves verticillate, flowers purple. *U. purpurea*, p. 693
 - cc. Leaves crowded, pinnately divided, flowers yellow, 10-20 mm. broad. *U. vulgaris americana*, p. 694
 - ccc. Leaves scattered, dichotomously divided.
 - d. Cleistogamous flowers among the filiform leaves. *U. clandestina*, p. 692
 - dd. No cleistogamous flowers.
 - e. Bladders mainly on leafless branches.
 - f. Leaf segments linear, flat, *U. intermedia*, p. 693
 - ff. Leaf segments capillary. *U. fibrosa*, p. 690
 - ee. Bladders scattered among the filiform leaves. *U. gibba*, p. 692

Utricularia cornuta Mich. Horned Bladderwort.

Pl. CXII., Fig. 3.

Utricularia cornuta Michaux, Fl. Bor. Am. I. 12. 1803 [Canada].—Knieskern 22.—Britton 192.—Keller and Brown 294.

Sandy swamps of the Pine Barrens; frequent.

The Utricularias are particularly characteristic of the New Jersey pine barren bogs. Shallow ponds with sandy bottoms and masses of aquatic vegetation floating in them are favorite spots for the taller naked-stemmed species like this, *U. juncea* and *U. fibrosa*, while the strictly floating forms are found in deeper water in which great masses of living and decayed vegetation extend down for many feet. The present species is usually almost or entirely devoid of leaves or bladders, but Mr. S. S. Van Pelt collected a fine specimen at Toms River with a great mass of slender, almost filiform, leaves attached to the base. Perhaps they are present more frequently but detached in collecting.

Fl.—Late June into August.

Pine Barrens.—Toms River, Hanover, New Lisbon (C), Bamber, Double Trouble, Mayetta, Speedwell, Atsion, Batsto, Eighth St.

***Utricularia juncea* Vahl. Rush Bladderwort.**

Pl. CXII., Fig. 4.

Utricularia juncea Vahl. Enum. I. 202. 1805 [Cajenna and Porto Rico].

Common in bogs of the Pine Barrens and Cape May peninsula. Distinguished from *U. cornuta* by its smaller and more numerous flowers and the more scattered inflorescence, usually showing buds clear above the uppermost flowers and not covered by their petals, a character pointed out to me by Dr. J. H. Barnhart.

Fl.—Early August well into September.

Pine Barrens.—Forked River, Speedwell, Jackson, Ancora, Pleasant Mills, Egg Harbor, Dennisville.

Cape May.—Cold Spring, Bennett.

***Utricularia virgatula* Barnhart. Barnhart's Bladderwort.**

Pl. CXIII., Fig. 1.

Utricularia virgatula Barnhart, Bull. Torr. Bot. Club XXXIV: 580. 1907 [Riverhead, Suffolk Co., N. Y. (L. I.)].

Apparently rare and known from but two stations within our region.

Fl.—Early August into September (apparently).

Pine Barrens.—Jackson.

Cape May.—Cold Spring.

***Utricularia resupinata* B. D. Greene. Reversed Bladderwort.**

Utricularia resupinata B. D. Greene in Bigel. Fl. Bost. Ed. III. 10. 1840 [Tewksbury, Mass.].—Britton 191.—Keller and Brown 294.

Very rare; known only from a mill pond on the mainland opposite Sea Isle City, where it was collected by Mr. Isaac Burk in 1887. Specimens are in the State Herbarium at New Brunswick, the Philadelphia College of Pharmacy and the Philadelphia Academy, and although they are not prepared very well they show clearly the characteristics of this interesting species.

Coast.—Ocean View.

***Utricularia fibrosa* Walt. Fibrous Bladderwort.**

Pl. CXIV., Fig. 1.

Utricularia fibrosa Walter, Fl. Car. 64. 1788 [Carolina].—Britton 192.—Keller and Brown 295.

Shallow sandy ponds in the Pine Barrens; common.

Fl.—Late May into September.

Middle District.—Elmer (C).

Pine Barrens.—Upper Squankum (Willis), Manchester (C), Lakehurst, Toms River, Whitings, Brindletown, Brown's Mills (C), Double Trouble, Dover Forge, Forked River, Barnegat (KB), Tuckerton, Speedwell (S), High Bridge (S), Bear Swamp, Clementon, Tomlinson's, Jackson, Atco, Cedar Brook, Franklinville (C), Malaga (C), Landisville, Inslip, Hammonton, Atsion (C), Pomona (KB), Quaker Bridge, Egg Harbor City (KB), Pancoast, Mays Landing.

***Utricularia subulata* L. Zig-zag Bladderwort.**

Pl. CXIII., Fig. 3.

Utricularia subulata Linnæus, Sp. Pl. 18. 1753 [Virginia].—Knieskern 22.—Britton 192.—Keller and Brown 294.

?*Utricularia minor* Pursh, Fl. Am. Sept. I. 15. 1814.—Barton, Fl. Phila. I. 11. 1818.

Shallow sandy ponds or wet sand; common in the Pine Barrens and Cape May peninsula, locally on the coast islands and very rare in the Middle district.

Fl.—Late May into September.

Middle District.—Woodbury.

Pine Barrens.—Island Hts., Toms River (S), Whitings, Brown's Mills (KB), Hanover (KB), Manchester (P), Bamber, Forked River, Waretown, Chatsworth, Speedwell (S), Parkdale (S), Blue Anchor, Bear Swamp, Taunton, Clementon, Sumner, Atco (KB), Hammonton (KB), Atsion, Quaker Bridge, Pleasant Mills, Egg Harbor City, Mays Landing, Pancoast, Absecon.

Coast Strip.—Spray Beach (L), Beach Haven (L).

Cape May.—Cape May (S).

***Utricularia cleistogama* L. Pin-like Bladderwort.**

Pl. CXIII., Fig. 4.

Utricularia subulata var. *cleistogama* A. Gray, Syn. Fl. II. Pt. 1. 317. 1878 [Pine Barrens of New Jersey].

Utricularia cleistogama Britton 192.—Keller and Brown 294.

Wet sand in the Pine Barrens and occasionally on the coast and Cape May peninsula; locally frequent.

Discovered September, 1866, in the New Jersey Pine Barrens by Mr. J. A. Paine, Jr.

This little plant is probably the smallest terrestrial species of our district, consisting of a filiform stem, often not more than an inch in height, with one or two supposedly cleistogamous

purplish flowers no larger than the head of a pin. It is the opinion of some botanists that this is merely a depauperate cleistogamous form of the last, and perhaps it may prove to be so.

Fl.—Probably similar to the last.

Pine Barrens.—Forked River, Bear Swamp (= Medford in KB), Clementon, Inskip, Atsion, Egg Harbor City, Pancoast, Woodbine, Calico.

Coast Strip.—Spray Beach (L).

Cape May.—Cape May (S).

***Utricularia clandestina* Nutt. Hidden-fruited Bladderwort.**

Pl. CXIII., Fig. 2.

Utricularia clandestina Nuttall in Gray. Man. 287. 1848 [Tewksbury, Mass., and R. I.].—Willis 41.—Britton 191.—Keller and Brown 295.

Frequent in ponds in the Pine Barrens and locally along the Delaware River Valley in the Middle district. This is a northern species, reaching its southern limit in New Jersey and Delaware.

Fl.—Early July into September.

Middle District.—Monmouth Co. (C), Tracy's (C), Delanco, Mickleton (KB), Williamstown, Washington Park (S), Woodbury.

Pine Barrens.—Island Hts. (KB), Toms River, Double Trouble, Forked River, Manahawkin, Chatsworth (C), Bear Swamp, Taunton (NB), Berlin (C), Clementon, Atco (C), Waterford (C), Ancora (KB), Vineland (C), Millville (KB), Hammonton, Atsion, Pleasant Mills, Mays Landing (C), Absecon (KB), Woodbine (S), Sea Isle Jnc.

***Utricularia gibba* L. Humped Bladderwort.**

Pl. CXIII., Fig. 5.

Utricularia gibba Linnæus, Sp. Pl. 18. 1753 [Virginia].—Pursh, Fl. Am. Sept. I. 16. 1814.—Britton 192.—Keller and Brown 295.

In bogs and ponds; frequent or occasional in the Middle and Cape May districts, occurring north of our limits at Closter and Woodside, Bergen County. Apparently very rare in the Pine Barrens.

Fl.—Early July into September.

Middle District.—Freehold (C), Delanco, Kaighns Pt., Center Square, Mickleton (KB), Pennsgrove.*

Pine Barrens.—Bay Head (NB), Hammonton.

Cape May.—Cold Spring, Cape May, Cape May Pt.

* Swedesboro (KB) = Center Square.

***Utricularia intermedia* Hayne. Flat-leaved Bladderwort.**

Pl. CXII., Fig. 1.

Utricularia intermedia Hayne in Schrad. Jour. Bot. I. 18. 1800 [Upsal, Sweden].—Britton 191.—Keller and Brown 295.

Bogs near Ogdensburg, Sussex County, Budds Lake, Morris County, the Hackensack Swamps and New Durham; south along the coast to Forked River and at Camden in the Middle district.

Fl.—July 7, 1910, in full bloom at Pt. Pleasant; rarely found flowering in our range.

Middle District.—Camden.

Pine Barrens.—Pt. Pleasant, Bay Head, Toms River (KB), Forked River.*

***Utricularia inflata* Walt. Swollen Bladderwort.**

Pl. CXIV., Fig. 2.

Utricularia inflata Walter, Fl. Car. 64. 1788 [Carolina].—Willis 41.—Britton 191.—Keller and Brown 294.

Utricularia ceratophylla Barton, Fl. Phila. I. 11. 1818.

Ponds in the Middle, Pine Barren and Cape May districts; frequent. Reported from north of our limits only from near Plainfield.

Some of our specimens, probably all from the Pine Barrens, are referable, apparently, to var. *radiata*,† but the characters are so unsatisfactory that it seems to be based merely upon small, less-robust specimens.

Fl.—Mid-June into September.

Middle District.—Birmingham, Center Square, Woodbury (C), Mickleton (KB), Tomlinson's, Riddleton, Palatine.

Pine Barrens.—Long Branch (C), Spring Lake (C), Forked River (KB), Taunton (KB), Berlin (C), Clementon, Lucaston (KB), Vineland (C), Hammonton (C), Egg Harbor City.

Cape May.—Bennett, Whitesboro, Cape May (KB).

***Utricularia purpurea* Walt. Purple Bladderwort.**

Pl. CXII., Fig. 4.

Utricularia purpurea Walter, Fl. Car. 64. 1788 [Carolina].—Knieskern 22.—Willis 41.—Britton 192.—Keller and Brown 294.

Ponds in the Pine Barren and Cape May districts; rather frequent, and at a few stations in the Middle district.

* The Quaker Bridge (KB) record has not been substantiated and seems unlikely.

† Cf. Small, Southern Flora, p. 1090.

The purple flowers of this species are very conspicuous, rising above the surface of the water from a mass of floating filiform leaves and bladders. It is the only purple-flowered species in our range, except the very rare *V. resupinata*.

Fl.—Mid-July into September.

Middle District.—Repaupo, Swedesboro, Franklinville (P).

Pine Barrens.—Toms River, Brown's Mills (Leeds), Speedwell (S), Jackson, Malaga (NB), Landisville, Hammonton, Quaker Bridge, Mullica River, Pleasant Mills.

Cape May.—Nummerytown, Bennett.

***Utricularia vulgaris americana* Gray. Greater Bladderwort.**

Utricularia vulgaris var. *americana* Gray, Man. Ed. V. 318 [America].

Utricularia vulgaris Barton, Fl. Phila. I. 10. 1818.—Britton 191.

Frequent in ditches and streams of the northern counties and occasional in the Middle and Cape May districts.

Fl.—Early June to late August.

Middle District.—Pt. Pleasant, Bordentown, Gloucester, Kaigns Pt., Center Square, Repaupo, Swedesboro.

Cape May.—New England Creek.

Family OROBANCHACEÆ. Broom-rapes.

a. Flowers of two kinds, scattered along slender paniced branches, lower cleistogamous and fertile, upper tubular sterile. *Leptamnium*, p. 695

aa. Flowers all alike in a spike or solitary.

b. Flowers in a thick, scaly brown spike. *Conopholis*, p. 695

bb. Flowers yellow-brown or purplish in a loose spike at the summit of a pubescent stem. [*Orobanche minor*]*

bbb. Flower solitary, white tinged with violet. *Thalesia uniflora*, p. 694

THALESIA Rafinesque.

***Thalesia uniflora* L. One-flowered Broom-rape.**

Orobanche uniflora Linnæus, Sp. Pl. 633. 1753 [Virginia].

Aphyllon uniflorum Knieskern 22.—Britton 190.

Frequent in woodlands of the northern counties and occasional within our limits in the Middle district only.

Fl.—Early May to early June.

Middle District.—Farmingdale, New Egypt, Kinkora, Beverly.

* Clover Broom-rape. Parasitic on clover roots.

CONOPHOLIS Wallroth.**Conopholis americana** (L. f.). Squaw Root.

Orobanche americana Linnæus, fl. Suppl. 88. 1767 [Carolina].

Conopholis americana Willis 42.—Britton 190.—Keller and Brown 296.

Rare and local in woods of the Northern counties. Its occurrence within our limits rests wholly upon the indefinite statement in Britton's Catalogue on authority of C. F. Parker for Camden Co. The Swedesboro record in Keller and Brown's List was an error of compilation, as Mr. Lippincott's specimens were really from a Pennsylvania locality.

Middle District.—Camden Co. (C).

LEPTAMNIUM Rafinesque.**Leptamnium virginianum** (L.). Beech-drops.

Orobanche virginiana Linnæus, Sp. Pl. 633. 1753 [Virginia].

Epiphegus Virginiana Britton 191.

Leptamnium Virginianum Keller and Brown 296.

Common in Beech woods of the northern counties and occasional southward within our limits in the Middle district.

This brown, branched, fungus-like plant is always associated with Beech trees on the roots of which it is parasitic.

Fl.—Early September into October.

Middle District.—New Egypt, Pemberton (NB), Mickleton (C), Oaklyn (S), Lawnside (S), Swedesboro.

Family **BIGNONIACEÆ**. Trumpet Creepers, etc.

a. Flowers bright red, plant a climbing vine. *Tecoma*, p. 695

aa. Flowers white with frilled edges, leaves large, broadly ovate. A large tree.

[*Catalpa catalpa*]*

TECOMA Jussieu.**Tecoma radicans** (L.). Trumpet Creeper.

Bignonia radicans Linnæus, Sp. Pl. 624. 1753 [America].—Barton, Fl. Phila.

II. 43. 1818.

Tecoma radicans Britton 193.—Keller and Brown 296.

Thickets in low grounds; frequent in the lower Cape May peninsula, the southern coast islands and in Cumberland and Salem Counties.

* *Catalpa* or Indian Bean escaped from cultivation.

Also possibly native along the Delaware to Camden and on the coast to Pt. Pleasant. Farther north it is certainly an escape. Barton records it from "a watery thicket three miles below Kaighns Point."

This gorgeous climber is so familiar in cultivation that one does not realize that it is wild when he first comes upon it in its native habitat. It is a familiar sight in lower Cape May, climbing over dead trees and fence posts, its clusters of big red blossoms almost constantly haunted by the Ruby-throated Humming birds seeking honey from their long tubes.

Fl.—Mid-July to mid-August, sporadically later.

Middle District.—Pt. Pleasant (KB), Delair, Cooper's Ferry, Pea Shore (P), Westville (KB), Washington Park (KB), Swedesboro (CDL), Riddleton (KB), Haleyville (NB), Salem (S).

Cape May.—Nummeytown (S), Dias Creek, Cape May, Cape May Pt.

Coast Strip.—Beesley's Pt. (S), Piermont, Anglesea (UP).

Family ACANTHACEÆ. *Acanthus*, etc.

a. Flowers large (35–50 mm.), funnel form, pale blue, axillary. Plant hairy, 3–6 dm. high, with oval leaves. *Ruellia*, p. 696

aa. Flowers small (10–12 mm.) in axillary clusters or single, purplish. Plant glabrous, 3–9 dm. high, with linear lanceolate, entire leaves.

Dianthera, p. 697

RUELLIA L.

Ruellia ciliosa Pursh. **Hairy Ruellia.**

Pl. CXV.

Ruellia ciliosa Pursh, Fl. Am. Sept. 420. 1814 [Savannah, Ga.].—Britton 193.—Keller and Brown 297.

Lower Cape May peninsula; locally common in thickets along the edge of the salt marshes.

This fine plant was first discovered in the State by Mr. Isaac Burk* east of Cape May Court House and proved later to be of regular occurrence along the Coastal strip from there to Cold Spring.

The *Ruellias* seem to be in need of careful study and revision. The New Jersey plant is quite different from the southern sessile-leaved species, called *R. ciliosa* in some herbaria. The leaves are short petioled, and calyx lobes filiform, strongly ciliate. It is

* 1816–1893. A zealous collector of the flora of southern New Jersey, and during the last years of his life engaged in mounting the collection at the Philadelphia Academy.

perhaps *R. parviflora* (Nees), but in the absence of authentic specimens of this species for comparison I have retained the name heretofore given to the New Jersey plant.

Fl.—Mid-July to early August, rarely later.

Cape May.—Court House, Cold Spring.

DIANTHERA L.

Dianthera americana L. Water Willow.

Dianthera americana Linnæus, Sp. Pl. 27. 1753 [Virginia].—Britton 193.—Keller and Brown 297.

Justicia pedunculosa Barton, Fl. Phila. I. 9. 1818.

In shallow water, locally along the Delaware River north to Bordentown, and on the Raritan. This is another of the plants that push up the Susquehanna in Pennsylvania and to a less degree up the Delaware c.f. *Lippia*, *Boltonia*, *Eupatorium cocles-tinum*, etc.

Fl.—Early June to late August.

Middle District.—Bordentown (NB), Redbank, Swedesboro.*

Family PHRYMACEÆ. Lopseed.

PHYRMA L.

Phryma leptostachya L. Lopseed.

Phryma leptostachya Linnæus, Sp. Pl. 601. 1753 [North America].—Knies-kern 23.—Britton 194.

Woods; frequent in the northern counties; rare and local within our limits in the Middle and lower Cape May districts.

Fl.—Early July to late August. *Fr.*—Early August to late September.

Middle District.—New Egypt, Blackwood, Swedesboro, Gloucester (P).

Cape May.—Cape May.

* Mr. Jahn's record for Five-Mile Beach, given in Keller and Brown's list, was due to a confusion of names. *Lippia* was the plant he had in mind.

Order PLANTAGINALES.

Family PLANTAGINACEÆ. Plantains.

PLANTAGO L.

Fruiting Data.—The time of year noted indicates the season of fully developed (and commonly mature) capsules.

Key to the Species.

- a. Corolla of fertile flowers closed over the fruit, flowers in slender spikes.
 - b. Leaves spatulate lanceolate, very pubescent, stamens 4. *Plantago virginica*, p. 699
 - bb. Leaves linear, stamens 2. *P. elongata*, p. 700
- aa. Corolla of fertile flowers not closed over the fruit.
 - b. Leaves more or less dilated, strongly ribbed, flowers in a slender spike.
 - c. Pod splitting around the middle.
 - d. Plant nearly smooth, leaves broad, elliptic to cordate, ovate, undulate or slightly toothed. [*P. major*]¹
 - dd. Plant often quite pubescent, leaves lance ovate or narrowly elliptic. *P. halophila*, p. 698
 - cc. Pod splitting much below the middle. *P. rugelii*, p. 699
 - bb. Leaves lanceolate, flowers in a short terminal spike or head. [*P. lanceolata*]²
 - bbb. Leaves linear or setaceous.
 - c. Leaves setaceous, loosely pubescent, bracts exceeding the calyx and giving a bristly appearance to the head. [*P. aristata*]³
 - cc. Leaves linear or subterete, fleshy, flowers in a long, slender raceme. *P. decipiens*, p. 699

Plantago halophila Bicknell. Salt Marsh Plantain.

Plantago halophila Bicknell, Britt. Manual 1051 [VanCourtland Park, N. Y. City].—Keller and Brown 298.

A plantain closely related to the common weed, *P. major*, occurs along the edge of the salt marshes.

In the new Gray's Manual it is treated as a variety *intermedia* Gilibert, while Mr. Bicknell has described it as a species *P. halophila*, not having material necessary for a study of its relationship, I use the latter name, which beyond question refers to our plant.

Fr.—June into October.

¹ Common Plantain, a familiar weed.

² Ribwort, a common weed.

³ Large-bracted Plantain, introduced from the west.

Maritime.—Surf City (L), Barnegat City Inc. (L), Tucker's (L), Absecon, Somer's Pt., Palermo, Anglesea, Cape May Court House, Cape May.

***Plantago rugelii* Dcne. Rugel's Plantain.**

Plantago Rugelii Decaisne in D. C. Prodr. XIII. pt. 1. 700. 1852 [Decatur, Alabama].—Britton 203.

Reported from the Middle and Coast districts, and probably found also in the northern counties; generally confused with *P. major* and apparently largely or entirely a weed.

Fr.—June into October.

***Plantago decipiens* Barneoud. Seaside Plantain.**

Plantago decipiens Barneoud, Mon. Plant. 16. 1845 [Labrador].—Britton 203.

Plantago maritima Knieskern 21.—Willis 40.—Keller and Brown 298.

Frequent along the salt marshes of the coast, reaching here the southern limit of its distribution. Has also been found in a swamp on the Palisades between Guttenburg and Bull's Ferry.

Fr.—July into October.

Maritime.—Pt. Pleasant, Brigantine, St. Albans (L), Half-way House south of Bond's (L), Absecon, Atlantic City, Ocean City, Palermo, Wildwood, Cape May (OHB).

***Plantago virginica* L. Dwarf Plantain.**

Plantago virginica Linnæus, Sp. Pl. 113. 1753 [Virginia].—Barton, Fl. Phila. 1. 89. 1818.—Knieskern 21.—Britton 204.

Common in open sandy ground throughout the Middle and Cape May districts, and occasional on the coast; seldom ranging above the fall line, except along the Delaware River. Often occurs as a weed in cultivated ground and may, no doubt, be introduced into the Pine Barrens in this way.

Fr.—May into June or July.

Middle District.—New Egypt, Crosswicks, Greenville, Kinkora, Medford (S), Woodbury, Woodbury Hts., Mickleton, Mantua, Glassboro, Bridgeton (S).

Coast Strip.—Beach Haven (L).

Cape May.—Cape May (OHB).

Plantago elongata Pursh. Slender Plantain.

Plantago elongata Pursh, Fl. Am. Sept. 729. 1814 [Upper Louisiana].—
Britton 204.—Keller and Brown 298.

Open sandy ground of the Middle and Cape May districts;
rare. Not reported from the State north of our limits.

Middle District.—Keyport (C), Pt. Pleasant (Williamson), Haddonfield (C).

Cape May.—Cape May (S).

Order RUBIALES.**Family RUBIACEÆ. Madder, etc.***Key to the Species.*

- a. Shrub, with white flowers in dense globular heads. *Cephalanthus*, p. 702
- aa. Herbs.
 - b. Leaves opposite.
 - c. Trailing, evergreen, with two white funnel-form flowers (10-12 mm. long), with united ovaries producing a red twin berry. *Mitchella*, p. 793
 - cc. Flowers not twin.
 - d. Flowers axillary, funnel-form, white or lilac, plant much branched from near the base, branches procumbent.
 - e. Leaves linear-lanceolate, flowers 4-6 mm. long. *Diodia teres*, p. 793
 - ee. Leaves lanceolate or oval, flowers 12 mm. long. *D. virginiana*, p. 793
 - dd. Flowers terminal and axillary, sessile in clusters, very small, 2 mm. broad, white, plant usually very low and tufted. *Oldenlandia*, p. 702
 - ddd. Flowers terminal, larger, 8-12 mm. broad, leaves lanceolate, basal spatulate.
 - e. Flowers blue, with a yellow center, salverform, a dense rosette of basal leaves. *Houstonia coerulea*, p. 701
 - ee. Flowers lilac, funnel-form. *H. longifolia*, p. 701
 - bb. Leaves verticillate, stems square.
 - c. Corolla, funnel-form pink, flowers in involucrate heads. [*Sherardia avensis*]*
 - cc. Corolla rotate.
 - d. Annual; fruit and plant bristly hispid, reclining on bushes, etc., leaves 6 and 8 in a whorl. *G. apparine*, p. 704
 - dd. Perennials.
 - e. Fruit bristly hispid.

* Blue Field Madder, a weed in cultivated ground.

- f. Leaves 4 in a whorl, 1 nerved.
 g. Hirsute pubescent. *Galium pilosum*, p. 704
 gg. Glabrous or nearly so. *G. pilosum puncticulosum*, p. 705
- ff. Leaves 4 in a whorl, 3 nerved.
 g. Upper leaves lanceolate acuminate. *G. lanceolatum*, p. 705
 gg. Upper leaves ovate, oval or obovate, obtuse. *G. circaezans*, p. 705
G. triflorum, p. 705
- fff. Leaves 6 in a whorl.
G. triflorum, p. 705
- ee. Fruit smooth and glabrous.
 f. Fruit dry.
 g. Leaves obtuse.
 h. Corolla 2-2.5 mm. broad, white, leaves, mostly in 4's. *G. tinctorium*, p. 706
 hh. Corolla 1.5 mm. broad or less, greenish white, leaves 4 or 6 in a whorl. *G. claytoni*, p. 706
 gg. Leaves acute or cuspidate.
 h. Stem nearly or quite smooth.
 i. Leaves all in 6's. *G. concinnum*, p. 706
 ii. Leaves in 8's, or in 6's on the branches. [*G. erectum*]*
 hh. Stem retrorse hispid, leaves 6 in a whorl or 4-5 on the branches. *G. asprellum*, p. 707
- ff. Fruit fleshy, resembling a double berry, plant glabrous or hirsute, leaves in 4's. *G. hispidulum*, p. 707

HOUSTONIA L.

Houstonia cærulea L. Bluets. Quaker-Lady.†

Houstonia cærulea Linnæus, Sp. Pl. 105. 1753 [Virginia].—Barton Fl. Phila.

I. 84. 1818.—Willis 29.—Britton 125.

Oldenlandia cærulea Knieskern 17.

Frequent in open, damp sandy ground, meadows, etc., in the northern counties, but rare and local within our limits and confined to the upper edge of the Middle district or close to the Delaware.

Fl.—Late April to late May.

Middle District.—Shark River (C), Allentown (C), New Egypt, Vincentown (C), Kinkora, Camden Co. (C), Stoe Creek Twp. (C).

* Wild Madder, occasional on roadsides.

† *Houstonia longifolia* Gaertner (Fruct. I. 226, pl. f. 8. 1788, no location), was collected at Manchester, Ocean County, by J. W. Chickering, Jr., in 1877, according to Britton (125); not known from elsewhere in the State and perhaps merely a casual introduction. I have seen no specimens.

OLDENLANDIA L.

Oldenlandia uniflora L. Clustered Bluets.

Oldenlandia uniflora Linnæus, Sp. Pl. 119. 1753 [Virginia].—Britton 125.—Keller and Brown 299.

Oldenlandia glomerata Pursh, Fl. Amer. Sept. I. 102. 1814.—Willis 29.

Frequent along the edge of the Coast strip, where it joins the salt marshes, and along the edge of brackish or fresh marshes near the Delaware River north to Burlington. Also reported from Manchester (Britton's Catalogue). North of our limits it is reported from only one station in the State—Closter, Bergen County.

Fl.—Late July to early September.

Middle District.—Near Burlington, Camden, Kaighns Pt., Westville (KB), Mickleton, Swedesboro, Riddleton, Elsinboro (C), Sea Breeze (C), Dividing Creek.

Pine Barrens.—Manchester (C).

Coast Strip.—Belmar, Como (T), Spring Lake (C), Brielle (C), Forked River, Barnegat City (L), Surf City (L), Sherburn's (L), N. Beach Haven (L), Spray Beach (L), Atlantic City (KB), Ocean City (KB), Palermo, Wildwood (UP), Cold Spring (S), Cape May, Cape May Pt. (S).

CEPHALANTHUS L.

Cephalanthus occidentalis L. Button-bush.

Pl. XCVI., Fig. 1.

Cephalanthus occidentalis Linnæus, Sp. Pl. 95. 1753 [America].—Barton, Fl. Phila. I. 80. 1818.—Knieskern 17.—Britton 124.

Swamps and edges of streams; frequent throughout the State, but less plentiful in the Pine Barrens, which it usually enters along the larger streams.

A conspicuous bush in mid-summer, with its spherical masses of small, white flowers, resembling white "button-balls."

Fl.—Early July to early August.

Middle District.—New Egypt, Delanco (S), Delair, Camden (P), Fish House, Lindenwold (S), Paulsboro, Haddonfield (P), Swedesboro (CDL).

Pine Barrens.—Bear Swamp (S), Landisville, Hammononton (Bassett), Atsion (S), Pleasant Mills, Pancoast (S), Weymouth.

Coast Strip.—Peahala (L), Ship Bottom (L), Five-mile Beach (UP).

Cape May.—Court House, Nummeytown (S), Cold Spring (OHB), Bennett (S).

MITCHELLA L.

Mitchella repens L. Partridge Berry, Twin Berry.

Pl. LXI., Fig. 2.

Mitchella repens Linnæus, Sp. Pl. III. 1753 [Carolina, Virginia and Maryland].—Barton, Fl. Phila. I. 85. 1818.—Knieskern 17.—Britton 125.

Frequent in woods throughout the State, except in the Pine Barrens, where it occurs rarely along the larger streams as an intrusion from the coast. The twin flowers with united ovaries, and the double red berry, are unique among our plants.

Fl.—Late May to late June. *Fr.*—Autumn, persisting over winter, often into the spring.

Middle District.—Farmingdale, New Egypt, Birmingham, Medford (S), Oaklyn (S), Sicklerville, Swedesboro, Yorktown, Dividing Creek.

Pine Barrens.—Hammonton (Bassett), Weymouth, Pleasant Mills.

Coast Strip.—Forked River, Cox's, Surf City (L), Atlantic City (S), Ocean City (S), Piermont (S), Wildwood (UP).

Cape May.—Cold Spring, Cape May Pt. (S).

DIODIA L.

Diodia teres Walt. Rough Buttonweed.

Diodia teres Walter, Fl. Car. 87. 1788 [Carolina].—Knieskern 17.—Britton 125.

Sandy open ground; frequent throughout the Middle, Coast and Cape May districts and occasional in the Pine Barrens.

To the north it extends up the Delaware to Warren County, and also to Passaic and Plainfield. Everywhere more or less of a weed.

Fl.—Mid-July to late September. *Fr.*—Mid-August to late October.

Middle District.—New Egypt, Florence Heights, Camden, Medford (S), Gloucester, Washington Park (S), Fairton (S).

Pine Barrens.—Lucaston Inc. (S), Landisville (T), Quaker Bridge (S), Egg Harbor City.

Coast Strip.—Barnegat City (L), N. Beach Haven (L), Tucker's (L), Atlantic City (S), Ocean City (S).

Cape May.—Cold Spring (S).

Diodia virginiana L. Larger Buttonweed.

Diodia virginiana Linnæus, Sp. Pl. 104. 1753 [Virginia].—Willis 29.—Britton 125.—Keller and Brown 299.

Found only in damp open ground in the lower part of the Cape May peninsula from Cape May to Dias Creek. First discovered in the State apparently by Parker and Read in 1871.

Fl.—Early June to late August. *Fr.*—Early August to late October.

Cape May.—Cape May, Dias Creek.

GALIUM L.

Galium aparine L. Cleavers.

Pl. CXVI., Fig. 1.

Galium Aparina Linnæus, Sp. Pl. 108. 1753 [Europe].—Britton 126.

Moist woods and thickets; common in the northern counties and frequent in the Middle and Coast districts; occasional on the Cape May peninsula.

Fl.—Early May to early June. *Fr.*—Late May to late June.

Middle District.—New Egypt, Beverly, Pemberton (NB), Medford (S), Sewell (S), Mickleton, Pitman, Riddleton, Elsinboro (C).

Coast Strip.—Surf City (L), Beach Haven Terrace (L), Spray Beach (L), Barnegat City (L).

Cape May.—Cold Spring (OHB).

Galium pilosum Ait. Hairy Bedstraw.

Pl. CXVIII., Fig. 1.

Galium pilosum Aiton, Hort. Kew. I. 145. 1789 [North America].—Knieskern 17.—Britton 126.

Frequent throughout the Middle, Coast and Cape May districts, ranging up the Delaware to Warren County, and on the Kittatinny Mountain. Two records from the Pine Barrens are in cultivated districts, and the plants may have been introduced, as all the other Pine Barren specimens belong to the following, which seems to replace true *pilosum* in that district.

Fl.—Late June to late July. *Fr.*—Late August into October.

Middle District.—Farmingdale, Florence Heights, Arney's Mt. (S), Medford (S), Fairton (S).

Pine Barrens.—Hammonton (Bassett), Landisville.

Coast Strip.—Sandy Hook, Pt. Pleasant (S), Manahawkin, Surf City (L), Atlantic City, Palermo, Stone Harbor, Anglesea.

Cape May.—Two miles west Court House (S), Dennisville (S), Bennett (S), Cold Spring (OHB).

Galium pilosum punctulosum (Michx.). **Pine Barren Bedstraw.***Galium punctulosum* Michaux, Fl. Bor. Am. I. 80. 1803 [Lower Carolina].*Galium pilosum* var. *punctulosum* Britton 127.—Keller and Brown 127.

Frequent in dry ground in the Pine Barrens which mark the northernmost limit of its range.

Fl. and *Fr.*—Probably as in the last.

Pine Barrens.—Ancora, Hammonton, Hospitality Br. Eighth St. (T), Egg Harbor City, Mays Landing (S), Beaver Dam.

Cape May.—Cold Spring (OHB).*

Galium lanceolatum (Torr.). **Torrey's Bedstraw.**

Galium circæzans var. *lanceolatum* Torrey, Cat. Plants, N. Y. 23. 1819 [Near New York].

Galium lanceolatum Willis 28.—Britton 127.—Keller and Brown 300.

Rocky woodlands; frequently in the northern counties; very rare within our limits and confined to the upper Middle district.

Fl.—Early June to early July. *Fr.*—Early August into September.

Middle District.—Freehold (C), Florence Hts.

Galium circæzans Michx. **Wild Liquorice.**

Pl. CXVII., Fig. 1.

Galium circæzans Michaux, Fl. Bor. Am. I. 80. 1803 [Carolina].—Britton 127.

Dry woods of the Northern, Middle and Cape May districts. Frequent north, but less common southward. Not reported from the Pine Barrens or coast.

Fl.—Early June to early July. *Fr.*—Late July into September.

Middle District.—New Egypt, Pemberton (Bassett), Medford (S), Oaklyn (S), five miles south of Mickleton, Swedesboro, Riddleton.

Cape May.—Bennett (S), Cold Spring (OHB).

Galium triflorum Michx. **Fragrant Bedstraw.**

Pl. CXVII., Fig. 3.

Galium triflorum Michaux, Fl. Bor. Am. I. 80. 1803 [Canada].—Knieskern 17.—Britton 126.

Frequent in dry woods of the northern counties ranging southward in the Middle district to our limits.

* Sea Isle City (KB) has not been substantiated, and is probably the former.

Fl.—Early July to early August. *Fr.*—Probably late August into September.

Middle District.—Bordentown, Delair, Moorestown, Taunton (NB), Florence Heights, Farmingdale, Oaklyn.

***Galium tinctorium* L. Stiff Marsh Bedstraw.**

Pl. CXVIII., Fig. 2.

Galium tinctorium Linnæus, Sp. Pl. 106. 1753 [N. America].

Galium trifidum var. *latifolium* Britton 126.

Frequent in swampy spots in the Northern, Middle and Cape May districts; occasional on the Coast strip and Cape May.

Fl.—Late May to early August. *Fr.*—Early August into October.

Middle District.—New Egypt, Crosswicks, Sewell (S), Medford (S), Lindenwold (S), Washington Park, Mickleton, Swedesboro, Riddleton, Sharps-town.

Coast Strip.—Toms River.

Cape May.—Cold Spring.

***Galium claytoni* Michx. Clayton's Bedstraw.**

Galium Claytoni Michaux, Fl. Bor. Am. I. 78. 1803 [Canada and New Jersey].

Galium trifidum Knieskern 16.—Britton 126.

Frequent in swampy ground throughout the State, except in the Pine Barrens, where it has not been detected.

Fl.—Late May to early August. *Fr.*—Early August into October.

Middle District.—Farmingdale, Brown's Mills, Pemberton Inc., Birmingham, Delanco (S), Riverside, Medford (S), Kaighns Pt., Washington Park, Mantua, Glassboro, Centerton (S), Yorktown, Riddleton, Andrews.

Coast Strip.—Toms River (S), Pt. Pleasant (S), Seaside Park, Barnegat City (L), Ship Bottom (L), Peahala (L), Spray Beach (L), West Creek, Atlantic City (S), Ocean City (S), Piermont (S), Wildwood.

Cape May.—Cold Spring, Cape May.

***Galium concinnum* T. & G. Shining Bedstraw.**

Galium concinnum Torrey and Gray, Fl. N. A. II. 23. 1841 [Ann Arbor, Mich., and Blue Lick, Ky.].—Britton 126.—Keller and Brown 301.

The occurrence of this species in the State rests upon a specimen in the State herbarium at New Brunswick labeled as collected by Thomas P. James in "N. J. near Phila." The speci-

men had passed through the hands of Dr. Thomas C. Porter and Charles E. Smith, the latter of whom presented it to Dr. Britton for the State collection.

***Galium asprellum* Michx. Rough Bedstraw.**

Pl. CXVII., Fig. 2.

Galium asprellum Michaux, Fl. Bor. Am. I. 78. 1803 [N. Canada].—Britton 126.

Moist thickets; frequent in the northern counties and occasional southward in the Middle district.

Fl.—Early July to late August. *Fr.*—Probably late August into October; usually imperfect and uncommon.

Middle District.—Farmingdale (NB), New Egypt, Sharptown.

***Galium hispidulum* Michx. Coast Bedstraw.**

Pl. CXVI., Fig. 2.

Galium hispidulum Michaux, Fl. Bor. Am. I. 79. 1803 [Lower Carolina].—Keller and Brown 301.—O. H. Brown, Barton 1910.

Galium peregrinum Britton 127.

Discovered in sandy ground on the Bay shore near the steamboat landing at Cape May Pt. September 2, 1874, by Mr. Albert Commons, and re-discovered in considerable abundance in the same neighborhood in September, 1910, by Mr. O. H. Brown. Town Bank is the most northern station for the species.

Fl.—Mid-July into August, probably. *Fr.*—Late September or October, persisting into December.

Cape May.—Cape May Pt., Town Bank.

Family CAPRIFOLIACEÆ. Honeysuckles, etc.

Key to the Species.

- a. Upright herbs, 6–10 dm. high. Leaves opposite, ovate to oval, abruptly narrowed near the base and clasping or perfoliate. Flowers purplish axillary, fruit an orang-yellow drupe. *Triosteum*, p. 711
- aa. Climbing woody vines with opposite ovate leaves and tubular, five-lobed, somewhat two-lipped flowers.
 - b. Flowers scarlet or somewhat tinged with yellow, berries scarlet. *Lonicera sempervirens*, p. 712
 - bb. Flowers white, turning to buff, berries black. *[L. japonica]**
 - bbb. Flowers yellowish green, tinged with purple. *L. dioica*, p. 712
- aaa. Woody shrubs, flowers small, white, in compound cymes.
 - b. Leaves pinnate, berries purplish black. *Sambucus*, p. 708

* Woodbine honeysuckle, escaped from cultivation.

bb. Leaves simple, flowers white in corymbs.

c. Leaves acutely and rather deeply three-lobed, coarsely dentate.

Viburnum acerifolium, p. 708

cc. Leaves ovate or orbicular, coarsely dentate, veins prominent.

d. Leaves glabrous or with pubescence in the axils of the veins beneath.

e. Petioles glabrous.

V. dentatum, p. 709

ea. Petioles very pubescent.

V. scabrellum, p. 709

dd. Leaves pubescent over the whole lower surface.

V. venosum, p. 710

ccc. Leaves ovate or oval, entire, crenate or finely serrate.

d. Leaves obscurely crenate or entire, cyme peduncled.

e. Peduncle shorter than the cyme, leaves smaller.

V. cassinoides, p. 710

ee. Peduncle longer than the cyme, leaves larger.

V. nudum, p. 710

dd. Leaves finely serrate, cyme nearly or quite sessile.

V. prunifolium, p. 711

bbb. Leaves simple, flowers tubular yellowish, in threes. *Diervilla*, p. 712

SAMBUCUS L.

Sambucus canadensis L. Elder.

Sambucus canadensis Linnæus, Sp. Pl. 269. 1753 [Canada].—Knieskern 16.—Britton 121.

Common in rich soil in open places throughout the Northern, Middle and Coast districts, and occasional on the Cape May peninsula. The only record from the Pine Barrens seems to be based upon an introduced plant, and it is quite likely that there are other similar occurrences. The Elder is, however, certainly not a native of the "Pines," although it may intrude along some of the larger streams, spreading up from the coast.

Fl.—Early June to early July. *Fr.*—Late July to late August, sporadically into September.

Middle District.—Farmingdale, New Egypt, Fish House, Arneys Mt. (S), Camden (T), Medford (S), Andrews, Oaklyn (S), Washington Park, Mickleton, Swedesboro, Yorktown, Centerton (S), Beaver Dam, Pancoastville.

Coast Strip.—Surf City (L), Barnegat City Inc. (L), Cox's, Manahawkin, Ocean City (S), Piermont (S), Wildwood (UP).

Cape May.—Cape May.

VIBURNUM L.

Viburnum acerifolium L. Maple-leaved Viburnum.

Viburnum acerifolium Linnæus Sp. Pl. 268. 1753 [Virginia].—Britton 122.

Common in the woods of the northern counties, less abundant southward in the Middle district and reported from one station on the coast.

Fl.—Late May to early June. *Fr.*—Late September into October.

Middle District.—New Egypt, Bordentown (C), Beverly, Birmingham, Pemberton Jnc. (S), Camden (C), Mt. Ephraim (C), Oaklyn (S), Gloucester, Clementon (NB), Swedesboro (CDL), Yorktown (S).

Coast Strip.—Absecon (C).

***Viburnum dentatum* L. Arrowwood.**

Viburnum dentatum Linnæus, Sp. Pl. 268. 1753 [Virginia].—Knieskern 16.—Britton 122.

Common in damp thickets throughout the State, except in the Pine Barrens, where it is found only as a coastal intrusion along the larger streams.

Fl.—Late May to mid-June. *Fr.*—Early August to early September.

Middle District.—Farmingdale, New Egypt, Westmont (S), Springdale (S), Medford (S), Bear Swamp (S), Oaklyn (S), Lawnside (S), Lindenvold (S), Washington Park, Swedesboro, Yorktown, Millville, Haleyville, Buckshutem, Vineland.

Coast Strip.—Pt. Pleasant, Bay Head, Ship Bottom (L), Beach Haven Crest (L), Waretown, Mays Landing, Weekstown.

Cape May.—Court House, Bennett.

***Viburnum scabrellum* (Torr. & Gray). Downy-stemmed Arrowwood.**

Viburnum dentatum var. *scabrellum* Torrey and Gray, Flora N. A. Vol. II. 16. 1841 [Carolina, *ex Michx.*].

Common in damp thickets throughout the State, except in the Pine Barrens.

We have two species equally common and usually closely associated—*V. dentatum*, with glabrous petioles, and the present form, which I take to be var. *scabrellum* T. and G., with densely pubescent petioles. The under side of the leaf is about the same in each, nearly glabrous, except for tufts of rusty hairs in the axils of the veins below. This species is perhaps a little more pubescent than *V. dentatum*, and one bush at Riddleton is doubtless referable to *V. venosum* Britton, although it differs from the

present species only in the increased pubescence on the under side of the leaves.

Fl.—Mid-June to early July. *Fr.*—Early September to early October.

Middle District.—Medford (S), Kaighns Pt., Collingswood (K&B), Westville, Washington Park, Lawnside (S), Mullica Hill (P), Swedesboro (KB), Fairton (S).

Coast Strip.—Sandy Hook, Long Branch, Bay Head, Manahawkin, Surf City (L), Atlantic City, Ocean City (S), Palermo (S), Holly Beach.

Cape May.—Green Creek, Dias Creek (S), Court House (S).

***Viburnum venosum* Britton. Coast Arrowwood.**

Viburnum venosum Britton, Man. 871. 1901 [Nantucket].—Keller and Brown 302.

? *Viburnum molle* Britton 122.

Found at one station in the Middle district. All other records refer to the preceding.

Middle District.—Riddleton.

***Viburnum cassinoides* L. Withe-rod.**

Viburnum cassinoides Linnæus Sp. Pl. Ed. 2. 384. 1762 [North America].—Keller and Brown 302.

Viburnum nudum var. *cassinoides* Britton 122.

Frequent in damp thickets and swamps in the Pine Barrens and locally in the Middle district, also in Sussex County, according to Britton.

Fl.—Late May to mid-June. *Fr.*—Late August into September.

Middle District.—Farmingdale, New Egypt, Sicklerville, Kirkwood (KB), Lindenwold (S), Repaupo (KB), Mickleton (KB), Tomlin, Williamstown, Sewell (S), Tomlinson's, Woodstown (KB).

Pine Barrens.—Pt. Pleasant (S), Toms River, Brown's Mills (Leeds), Bamber, Waretown, Forked River, Bear Swamp (S), Clementon, Albion, Cedar Brook, Landisville, Hammonton (KB), Batsto (KB), Mays Landing.

***Viburnum nudum* L. Larger Withe-rod.**

Viburnum nudum Linnæus, Sp. Pl. 268. 1753 [Virginia].—Barton, Fl. Phila. I. 152. 1818.—Knieskern 16.—Britton 122.

Frequent in swamps of the Pine Barrens and Cape May district and less frequently in the Middle district.

Reported in Britton's Catalogue from only four stations north of our limits, *i. e.*, Hackensack Marshes, Succasunna, Morris County, Sunfish Pond, Warren County, and Trenton.

Fl.—Mid-June to early July. *Fr.*—Early September to October.

Middle District.—Farmingdale, Kaighns Swamp, Camden (P), Pitman, Westville, Repaupo, Andrew's, Swedesboro.

Pine Barrens.—Forked River, Waretown, Barnegat, Manahawkin, Cox's, Williamstown Inc., Hammonton, Egg Harbor City, Folsom, Mays Landing.

Cape May.—Cold Spring, Cape May (S).

***Viburnum prunifolium* L.* Black Haw.**

Viburnum prunifolium Linnæus, Sp. Pl. 268. 1753 [Virginia and Canada].—Britton 122.

Viburnum pyrifolium Barton, Fl. Phila. I. 152.

Edges of woods and thickets in the Northern and Middle districts; frequent, especially northward. Very rare on the Cape May peninsula.

Fl.—Early May to late May. *Fr.*—Early September into October, or persistent somewhat later.

Middle District.—New Egypt, Kinkora, Burlington (C), Camden (P), Medford (S), Washington Park, Mickleton (C), Swedesboro, Alloway.

Cape May.—Cold Spring (OHB).

TRIOSTEUM L.

***Triosteum perfoliatum* L. Feverwort, Horse Gentian.**

Triosteum perfoliatum Linnæus, Sp. Pl. 176. 1753 [N. America].—Kniesskera 16.—Britton 123.

Frequent in rich woods in the northern counties and occasional southward in the Middle and Cape May districts. One station only in the Pine Barrens, in a grove near Hammonton, where it may likely have been introduced, as teams are frequently hitched there.

Fl.—Late May to mid-June. *Fr.*—Early September into October.

Middle District.—Red Bank, Washington Park, Sea Breeze (C).

Pine Barrens.—Hammonton.

Cape May.—Court House (S), Cold Spring.

* *V. lentago* is given in Britton's Catalogue as "frequent in Camden Co." on the authority of Mr. Martindale. This statement probably refers to *V. prunifolium*, as there is no evidence of the occurrence of *V. lentago* within our limits.

Triosteum aurantiacum Bicknell. **Scarlet-fruited Horse Gentian.**

Triosteum aurantiacum Bicknell, Torrey I. 26. 1901 [Van Courtland Park, N. Y. City].

Very rare within our limits in similar situations to the preceding.

Fl.—Mid-May to early June. *Fr.*—Early August into September.

Middle District.—Red Bank.

LONICERA L.

Lonicera dioica L. **Smooth-leaved Honeysuckle.**

Lonicera dioica Linnæus, Sp. Pl. Ed. 12. 165. 1767 [No location].—Keller and Brown 304.

Lonicera glauca Britton 124.

Frequent in damp rocky woods of the northern counties, also at three localities in Union and Essex Counties and at one station within our limits in the Middle district according to Britton.

Middle District.—Birmingham (C).

Lonicera sempervirens L. **Coral Honeysuckle.**

Lonicera sempervirens Linnæus, Sp. Pl. 173. 1753 [Virginia and Mexico].—Keller and Brown 304.—Britton 123.

Frequent in thickets of the Cape May and lower Middle districts; less common farther north, but ranging up the Delaware to Hunterdon County and to the New Durham Swamp, Hudson County, according to Britton. Often in other localities escaped from cultivation.

Fl.—Late May to late July.

Middle District.—Burlington (C), Moorestown (NB), Locust Grove, Washington Park, Sewell (S).

Coast Strip.—Anglesea, Piermont.

Cape May.—Cold Spring, Cape May, Cape May Pt.

DIERVILLA Moench.

Diervilla diervilla (L.). **Bush Honeysuckle.**

Lonicera diervilla Linnæus, Sp. Pl. 175 [Acadia and New York].

Diervilla Diervilla Keller and Brown 304.

Diervilla trifida Britton 123.

Mr. F. C. Jellett assures me that his record for *Diervilla diervilla* at Millville published in Keller and Brown's List is correct. He was familiar with the plant at the time, and although he pre-

served no specimen, he does not see how he could have mistaken anything else for it. He was visiting the station for *Chionanthus* and found the *Dicrvillea* growing with it. The plant is frequent in the northern counties, but this is our only evidence of its occurrence on the coastal plain.

Order VALERIANALES

Family VALERIANACEÆ. Valerians.

Valerianella radiata (L.). Beaked Corn Salad.

Valeriana Locusta var. *radiata* Linnæus, Sp. Pl. 34. 1753 [Maryland].

Mr. O. H. Brown assures me that this plant is native about Cape May in sandy woods, associated with *Myosotis virginica*.

It also occurs rarely in the Middle district.

Fl.—Late April to early June.

Middle District.—Washington Park.

Cape May.—Cold Spring.

Order CAMPANULALES.

Family CUCURBITACEÆ. Gourds, Melons and Cucumbers.

Key to the Species.

a. Leaves 3-7 lobed.

b. Fruit ovoid, fleshy, densely spiny.

Micrampelis, p. 713

bb. Fruits smaller, spiny, 3-10, together in a pedicelled head.

Sicyos, p. 714

MICRAMPELIS Rafinesque.

Micrampelis lobata (Mich.). Wild Balsam Apple.

Sicyos lobata Michx., Fl. Bor. Am. II. 217. 1803 [W. Penna., on the Ohio River].

Micrampelis echinata Britton III.

Occasional in the Middle district and rarely on the Cape May peninsula, usually near the Delaware. To some extent escaped from cultivation, possibly entirely so.

Fl.—Late July to late September. *Fr.*—Early September into October.

Middle District.—New Egypt, Burlington, Four miles south Swedesboro.

Cape May.—Cape May.

SICYOS L.

Sicyos angulatus L. Star Cucumber.*Sicyos angulata* Linnæus, Sp. Pl. 1013 [Canada and Mexico].—Knieskern 15.—Britton 111.

Frequent along the Delaware River and at a few other stations in the Middle district. To some extent a weed.

Fl.—Early August to late September. *Fr.*—Mid-September into October.*Middle District.*—New Egypt, Delair, Kaighns Pt., Washington Park, Swedesboro.

Family CAMPANULACEÆ. Bluebells and Lobelias.

Key to the Species.

- a. Corolla bell-like, white or bluish, stem weak and roughened. *Campanula aparinoides*, p. 714
- aa. Corolla rotate, violet, leaves orbicular, cordate clasping. *Specularia perfoliata*, p. 715
- aaa. Corolla tubular, five-lobed and more or less two-lipped.
 - b. Flowers bright scarlet. *Lobelia cardinalis*, p. 715
 - bb. Flowers blue.
 - c. Flowers 15–25 mm. long.
 - d. Leaves glabrous or slightly pubescent, flowers 20–25 mm. long. *L. syphilitica*, p. 716
 - dd. Leaves densely pubescent, flowers 15–20 mm. long. *L. puberula*, p. 716
 - cc. Flowers 4–10 mm. long.
 - d. Leaves ovate or oblong, dentate. *L. inflata*, p. 711
 - dd. Leaves on stem, linear, linear oblong or spatulate, scattered, basal leaves broadly oblong, obovate or spatulate.
 - e. Stems simple, inflorescence spike-like. *L. spicata*, p. 716
 - ee. Stems paniculately branched, flowers in loose racemes.
 - f. Corolla 5–7 mm. long, calyx tube hemispheric, in fruit. *L. nuttallii*, p. 717
 - ff. Corolla 9–10 mm. long, calyx tube turbinate. *L. canbyi*, p. 717

CAMPANULA L.

Campanula aparinoides Pursh. Marsh Bellflower.**Campanula aparinoides* Pursh, Fl. Am. Sept. 159. 1814 [Pennsylvania to Virginia].—Knieskern 20.—Britton 157.

* The record of *C. americana* from Swedesboro (KB) was an error. Mr. Lippincott states that he only reported *C. aparinoides*.

Frequent in swamps of the northern counties, becoming much less common southward in the Middle district, and rare and local in the Cape May peninsula.

Fl.—Late June to late August.

Middle District.—New Egypt, Pemberton Jnc., Hartford, Camden (P), Pitman, Swedesboro.

Cape May.—Cold Spring (S).

SPECULARIA Heist.

Specularia perfoliata (L.). Venus' Looking-glass.

Campanula perfoliata Linnæus, Sp. Pl. 169. 1753 [Virginia].

Specularia perfoliata Knieskern 20.—Britton 157.

Dry open ground throughout the State. Occurs in the Pine Barrens only as a weed in cultivated ground, and the same may be said of many other localities, so that its native habitat in the State is difficult to determine.

Conspicuous Fl.—Early June to early July.

Middle District.—New Egypt, Locust Grove (S), Medford (S), Westville, Washington Park, Swedesboro, Yorktown (S), Millville (S).

Pine Barrens.—Landisville, Mays Landing.

Coast Strip.—Spray Beach (L), Peahala (L).

LOBELIA L.

Lobelia cardinalis L. Cardinal Flower.

Pl. CXIX., Fig. 1.

Lobelia Cardinalis Linnæus, Sp. Pl. 930. 1753 [Virginia].—Knieskern 19.—Britton 156.

Wet grounds; frequent, except in the Pine Barrens, although it follows up the larger streams nearly or quite to the head of tide-water, as at Mays Landing.

This is one of the most brilliant flowers of the late summer swamps of North and West Jersey, its scarlet spike standing out in contrast to the dark green of the surrounding foliage. Along the coast it seems to reach its highest development. Sometimes it covers considerable areas of open wet swamps, where it is only two or three feet high, while elsewhere, as along the Bay shore of Cape May, it occurs in thickets and overgrown swamps, reaching a height of six or seven feet. Near Green Creek I found a plant with pale salmon pink flowers.

Fl.—Late July to mid-September.

716 REPORT OF NEW JERSEY STATE MUSEUM.

Middle District.—New Egypt, Smithville, Pemberton Jnc. (S), Delair, Medford (S), Washington Park, Lindenwold, Center Square, Blackwood, Swedesboro, Beaver Dam.

Coast Strip.—Manahawkin, West Creek (S), Weekstown, Absecon (S), Palermo (S), Ocean View (S), Mays Landing, Wildwood.

Cape May.—Court House, Cold Spring (S), Cape May (S), Green Creek, Dias Creek.

***Lobelia syphilitica* L. Great Blue Lobelia.**

Lobelia syphilitica Linnæus, Sp. Pl. 931. 1753 [Virginia].—Willis 36.—Britton 156.

Low open ground; frequent in the northern counties, but very rare within our limits.

Fl.—Early August to early October.

Middle District.—Keyport (C), Crosswicks Creek (C), Bordentown (C).

***Lobelia puberula* Michx. Downy Lobelia.**

Pl. CXX.

Lobelia puberula Michaux, Fl. Bor. Am. II. 152. 1803 [Carolina].—Britton 156.—Keller and Brown 307.

Frequent in moist open sandy ground in the lower part of the Cape May peninsula, and north along the coast to Beesley's Pt., and locally to Manahawkin; also locally in Cumberland and Salem Counties and at Hartford, Burlington County, Freehold, Monmouth County, and at Lawrenceville Landing, Mercer County.

Fl.—Early August to early October.

Middle District.—Freehold (C), Hartford, Course's Landing (KB), Woodstown (KB), Mannington (C), Haleville (KB).

Coast Strip.—Manahawkin, Atlantic City (KB), Beesley's Pt. (S), Palermo, Petersburg (KB), Seaville (S), Ocean View (S).

Cape May.—Cold Spring, Cape May, Cape May Pt., Dias Creek.

***Lobelia spicata* Lam. Slender Spiked Lobelia.**

Lobelia spicata Lamarck, Encycl. III. 587. 1789 [Canada].—Britton 156.

Frequent in open ground in the northern counties, and much less common southward in the Middle district. Apparently rare within our limits.

Fl.—Early June to late July, and sporadically later.

Middle District.—New Egypt, Lindenwold (S), Vineland (introduced?).

Lobelia inflata L. Indian Tobacco.

Lobelia inflata Linnæus, Sp. Pl. 931. 1753 [Virginia and Canada].—Knieskern 20.—Britton 156.

Frequent in open ground in the Northern and Middle districts. Largely a weed in cultivated ground and as such enters the Pine Barrens and probably the Cape May and Coast districts. Original native habitat not ascertainable.

Fl.—Mid-July to mid-September.

Middle District.—New Egypt, Florence Heights, Camden (P), Washington Park, Blackwood, Salem (S).

Pine Barrens.—Hammonton (Bassett), Landisville (T).

Lobelia nuttallii R. & S. Nuttall's Lobelia.

Lobelia Nuttallii Roemer and Schultze, Syst. V. 39. 1819 [new name for *L. gracilis* Nutt.].—Knieskern 20.—Britton 156.—Keller and Brown 307.

Lobelia gracilis Nuttall, Gen. II. 77. 1818 [New Jersey to Carolina].

Common in moist sandy ground throughout the Pine Barrens, Cape May and Coast districts, and at many stations in the Middle district, occurring north of our limits at Sayreville, Middlesex County.

Named for Thomas Nuttall (1786–1859), the famous botanist and ornithologist, for many years located at Philadelphia, where he published his Genera of N. A. Plants and studied carefully the region covered by the present work.

Fl.—Early July to early September.

Middle District.—Shark River, Farmingdale (S), Pt. Pleasant, Long Branch, New Egypt, Camden, Haddonfield (S), Tomlin, Swedesboro, Williamstown, Dividing Creek.

Pine Barrens.—New Lisbon, Hanover, Cedar Grove (S), Speedwell (S), Waterford, Cedar Brook, Buena Vista (T), Winslow (S), Hammonton, Pleasant Mills, Eighth St. (T), Egg Harbor City, Tuckahoe (S).

Coast Strip.—Ship Bottom (L), Spray Beach (L), Anglesea.

Cape May.—Court House (S), Cold Spring (S).

Lobelia canbyi Gray. Canby's Lobelia.

Lobelia Canbyi Gray, Man. Ed. V. 284. 1867 [Quaker Bridge, N. J.].—Willis 36.—Britton 157.—Keller and Brown 307.

Frequent in wet sandy spots in the Pine Barrens, reaching here the northern limit of its range.

A taller, somewhat more robust species than the last; usually with the flowers slightly tinted with lilac. It is restricted to the central Pine Barren region, and named for its discoverer William

M. Canby (1831-1904), the noted botanist of Delaware, and one of the most active students of the New Jersey Pine Barren flora.*

Fl.—Late July to late September.

Pine Barrens.—Lakelhurst, Bamber, Jones' Mill (S), Speedwell (S), Cedar Brook, Hammonton, Atsion, Parkdale, Quaker Bridge, Bear Swamp (S), Cedar Lake, Batsto, Opp. Crowleytown, Egg Harbor City, Belleplain, Woodbine.

Family CICHORIACEÆ. Chicory, Dandelions, etc.

Key to the Species.

- a. Flower heads drooping, with a long, cylindrical involucre.
 - b. Heads 5-7 flowered, pappus light straw color.
 - Nabalus attissimus*, p. 723
 - bb. Heads 8-16 flowered.
 - c. Pappus dark cinnamon-brown.
 - N. albus*, p. 724
 - cc. Pappus straw color or light brown.
 - d. Inflorescence paniculate.
 - e. Bracts shorter than the pappus.
 - N. serpentarius*, p. 724
 - ee. Bracts equal to the pappus.
 - N. trifoliolatus*, p. 723
 - dd. Inflorescence thyrsoid, often simple, and unilateral.
 - N. virgatus*, p. 724
 - aa. Flower heads not drooping.
 - b. Flowers blue or white.
 - c. Flower heads 25-37 mm. broad, bright blue or white.
 - [Cichorium intybus]*¹
 - cc. Flower heads 4-10 mm. broad.
 - d. Pappus white, flowers bright blue.
 - e. Leaves oblong to ovate, dentate.
 - Lactuca villosa*, p. 721
 - ee. Leaves pinnatifid.
 - L. floridana*, p. 721
 - dd. Pappus brown, flowers pale blue or bluish white.
 - L. spicata*, p. 721
 - bb. Flowers yellow or orange.
 - c. Leaves all basal, scapes with a single head of flowers.
 - d. Heads 15-50 mm. broad, flowers yellow.
 - [T. taraxacum]*²
 - dd. Heads 6-12 mm. broad, orange.
 - Adopogon carolinianum*, p. 719
 - cc. Cauline leaves present.
 - d. Cauline leaves 1-5, a rosette of basal leaves.
 - e. Flowers orange, plant glabrous and glaucous.
 - Adopogon virginicum*, p. 719
 - ee. Flowers yellow.

*cf. Torrey IV. 52.

¹Chicory. Introduced along roadsides, etc.

²Common Dandelion, an abundant weed.

f. Leaves more or less purple veined.

Hieracium venosum, p. 722

ff. Leaves green.

H. marianum, p. 722

dd. Cauline leaves numerous, flowers yellow.

e. Achenes flattened.

f. Truncate, not beaked, leaves pinnatifid.

[*Sonchus oleraceus*]*

ff. Narrowed at the summit or beaked, leaves pinnatifid or entire.

g. Plant glabrous.

h. Leaves sessile or auriculate at base.

Lactuca canadensis, p. 720.

hh. Leaves sagittate, clasping. *L. sagittifolia*, p. 721

gg. Leaves hirsute, at least on the mid-rib below.

L. hirsuta, p. 720

ee. Achenes cylindric or prismatic.

f. Achenes spindle-shaped or with the summit tapering at maturity.

Hieracium gronovii, p. 723

ff. Achenes of uniform diameter.

g. Peduncles stout, spreading. *H. scabrum*, p. 722

gg. Peduncles slender, ascending. *H. marianum*, p. 722

ADOPOGON Necker.

Adopogon virginicum (L.). *Cynthia*.

Tragopogon virginicum Linnæus, Sp. Pl. 189. 1753 [Virginia and Canada]

Cynthia virginica Knieskern 19.

Krigia amplexicaulis Britton 152.

Moist ground; frequent in the northern counties, becoming less frequent southward in the Middle district, and occasional in the Cape May peninsula. Very sparingly introduced in the Pine Barrens.

Fl.—Mid-May to mid-June.

Middle District.—Farmingdale, New Egypt, Brown's Mills, Pemberton (NB), Lindenwold (S).

Pine Barrens.—Egg Harbor City.

Cape May.—Cold Spring (OHB).

Adopogon carolinianum (Walt.). Dwarf Dandelion.

Hyoseris Caroliniana Walter, Fl. Car. 194. 1788 [Carolina].

Hyoseris ? *ramosissima* Barton, Fl. Phila. Prodr. 75. 1815 [Sandy fields, N. J.].

Krigia dichotoma Nuttall, Gen. II. 127. 1818 [n. n. for last].

Krigia Virginica b. *dichotoma* Barton, Fl. Phila. II. 93.

Krigia virginica Knieskern 19.—Britton 152.

* Sow Thistle, a frequent weed.

Dry sandy soil; frequent throughout our region and northward on the coastal plain, extending occasionally beyond the fall line.

Fl.—Early May to late June.

Middle District.—Farmingdale, New Egypt, Medford (S), Clementon, Gloucester, Westville, Mantua, Swedesboro.

Pine Barrens.—Toms River, E. Plains, Quaker Bridge, Landisville, Pleasant Mills.

Coast Strip.—Surf City (L), Beach Haven (L), Avalon, Piermont (S).

Cape May.—Cold Spring (OHB).

LACTUCA L.

Lactuca canadensis L. Tall Lettuce.

Lactuca canadensis Linnæus, Sp. Pl. 796. 1753 [Canada].—Britton 154.

? *Lactuca elongata* Knieskern 19.

Frequent in clearings, wood edges, etc., throughout the State, except in the Pine Barrens, where it is rare and apparently introduced.

Fl.—Late June into August.

Middle District.—Freehold (NB), Husted (S), Swedesboro, Fairton (S).

Pine Barrens.—Landisville.

Coast Strip.—Spring Lake (T), Seaside Park (S), Barnegat City (L), Surf City (L), Ship Bottom (L), Harvey Cedars (L), Anglesea, Holly Beach, Palermo (S).

Cape May.—Court House, Whitesboro (S), Cold Spring (S), Bennett.

Lactuca hirsuta Muhl. Hairy Lettuce.

Lactuca hirsuta "Muhlenberg," Nuttall Gen. II. 124. 1818 [Pennsylvania].

Britton 154.—Keller and Brown 310.

Occasional in the Coast and Middle districts, rare north of our limits.

Fl.—Mid-June into August.

Middle District.—Vincentown (NB), Camden Co. (C), Medford, Swedesboro.*

Coast Strip.—Asbury Park (KB), Spring Lake (C), Atlantic City (P), Holly Beach, Anglesea, Stone Harbor.

Pine Barrens.—Winslow Inc., White Horse (S) (probably introduced).

Cape May.—Bennett.

* *L. villosa* Swedesboro (KB) is this.

***Lactuca sagittifolia* Ell. Arrow-leaved Lettuce.**

Lactuca sagittifolia Elliot, Bot. S. C. and Ga. II. 253. 1821-4 [Columbia, S. C.].—Keller and Brown 310.

Occasional in the Coast and Middle districts, rare north of our limits.

Fl.—Late June to early September.

Middle District.—Swedesboro (KB).

Coast Strip.—Sandy Hook (NB), Asbury Park (KB), Seaside Park, Piermont (S), Wildwood.

***Lactuca villosa* Jacq. Hairy-veined Blue Lettuce.**

Lactuca villosa Jacquin, Hort. Schoen. III. 62, pl. 367. 1798 [Loc. unknown].—Britton 154.—Keller and Brown 310.

At several stations in the northern counties, but rare within our limits and confined to the Middle district.

Fl.—Early August to early September.

Middle District.—Medford (S).*

***Lactuca floridana* (L.). Florida Blue Lettuce.**

Sonchus floridanus Linnæus, Sp. Pl. 794. 1753 [Virginia and Canada].—Britton 154.—Keller and Brown 310.

Frequent along the Delaware as far south as Bordentown, and at the base of the Palisades.

Fl.—Early August to early September.

Middle District.—Bordentown (C), Swedesboro.

***Lactuca spicata* (Lam.). Tall Blue Lettuce.**

Sonchus spicatus Lamarck, Encycl. III. 401. 1789 [S. Carolina].—Keller and Brown 311.

Lactuca leucophaea Britton 154.

Frequent in the northern counties and occasional in the Middle and Cape May districts in rich soil.

Fl.—Early August into September.

Middle District.—Fish House (S), Springdale (S), Swedesboro, Salem (S).

Cape May.—W. Cape May.

* The Swedesboro record (KB) was an error of compilation. The specimen was from a Pennsylvania locality.

HIERACIUM L.

Hieracium venosum L. Rattlesnake Weed, Vein-leaved Hawkweed.

Hieracium venosum Linnæus Sp. Pl. 800. 1753 [Virginia].—Knieskern 19.—Britton 153.

Dry woodland, common throughout the State.

Fl.—Late May to early July, sporadically into September.

Middle District.—Farmingdale, New Egypt, Beverly, Medford (S), Washington Park, Glassboro, Sewell (S).

Pine Barrens.—Toms River, Bamber, Manahawkin, Tuckerton, East Plains (S), Winslow Jnc., Cedar Brook, Tabernacle, Landisville, Folsom, Mays Landing (S).

Cape May.—Court House (S), Dennisville (S), Cold Spring (OHB).

Hieracium marianum Willd. Maryland Hawkweed.

Hieracium Marianum Willdenow, Sp. Pl. III. 1572. 1804 [North America].—Keller and Brown 312.

These specimens are very unsatisfactorily identified. While the extreme examples fit the description of *H. marianum*, others seem to be merely *H. venosum* with one or two stem leaves. The veining does not seem to be an important character, as many specimens of *venosum* from the Pine Barrens have uniform green leaves and they also show great variation as to the amount of pubescence.

From the material in hand I cannot see any clear cut line of separation between the two, and possibly we do not have true *H. marianum* at all.

Middle District.—Grenloch.

Coast Strip.—Sea Bright, Atlantic City, Piermont, Five-Mile Beach.

Hieracium scabrum Michx. Rough Hawkweed.

Hieracium scabrum Michaux, Fl. Bor. Am. II. 86. 1803 [N. Canada and Mts. of Carolina].—Britton 152.

Dry open woods; frequent in the Northern and Middle districts and occasional on the Coast Strip.

The typical plant has large heads and a wide branching inflorescence, as opposed to the small heads and more strict inflorescence of *H. gronovii*.

We have also specimens with inflorescence of *gronovii*, but with broadly oval leaves all the way up the stem like *scabrum*.

and one from New Egypt which resembles *gronovii* in all respects except that the achenes are uniform in diameter and not narrowed above as in that species.

Fl.—Early August into September.

Middle District.—New Egypt, Hartford, Medford (S), Haddonfield, Oaklyn (S), Blackwood, Swedesboro, Millville, Beaver Dam.

Hieracium gronovii L. Hairy Hawkweed.

Hieracium Gronovii Linnæus, Sp. Pl. 802. 1753 [Virginia and Pennsylvania].

—Willis 35.—Britton 153.

Dry open woods; frequent throughout our limits and occasional in the northern counties.

Fl.—Early July into September.

Middle District.—Hartford, Florence, Medford (S), Lindenwold, Swedesboro.

Pine Barrens.—Toms River (NB), West Creek, Sumner (S), Landisville, Weymouth (T), Hammonton, Egg Harbor City, Mays Landing (S), Tuckahoe (S).

Coast Strip.—Forked River, Seaside Park, N. Beach Haven (L), Surf City (L), Absecon, Atlantic City, Somer's Pt., Ocean City (S), Wildwood.

Cape May.—Dennisville (S), Court House (S), Cold Spring (OHB).

NABALUS Cassini.

***Nabalus altissimus* (L.). Tall Rattlesnake-Root.**

Prenanthes altissima Linnæus, Sp. Pl. 797. 1753 [Virginia and Canada].—

Britton 155.

Rich woods of the northern counties and reported from one station in the Middle district within our limits.

Fl.—Late August to early October.

Middle District.—Vincentown (C).

***Nabalus trifoliolatus* Cass. Rattlesnake-Root.**

Nabalus trifoliolatus Cassini, Dict. Sci. Nat. 34, 95. 1825 [Cultivated plant].

Prenanthes Serpentaria Britton 155 (in part).

Dry woodland; common throughout the State, except in the Pine Barrens.

Fl.—Late August to early October.

Middle District.—Keyport (NB), New Egypt, Fish House (S), Medford (S), Orchard (S), Lindenwold, Blackwood, Westville, Beaver Dam.

Coast Strip.—Forked River, Manahawkin, Absecon, Atlantic City (S), Wildwood.

Cape May.—Seaville (S), Bennett (S), Court House (S), Cape May.*

Nabalus serpentarius (Pursh.). Pursh's Rattlesnake-Root.

Prenanthes Serpentaria Pursh, Fl. Am. Sept. 499. 1814 [Mts. of Virginia and Carolina].—Britton 155 (in part).

Frequent in the Pine Barrens and occasional on the coast.

Fl.—Late August to early October.

Pine Barrens.—Whitings (S), Pasadena, Atsion (S), Malaga (S), Landisville, Pleasant Mills, Egg Harbor City.

Coast Strip.—Piermont (S).

Nabalus virgatus (Michx.). Pine Barren Rattlesnake-Root.

Prenanthes virgata Michaux, Fl. Bor. Am. II. 83. 1803 [Virginia and Carolina].—Pursh, Fl. Am. Sept. II. 498. 1814.

Prenanthes autumnalis Britton 155.

Nabalus virgatus Keller and Brown 312.

Open sandy ground in the Pine Barrens.

This slender-spiked Rattlesnake-root is a plant of the central Pine Barrens, associated with *Solidago stricta* and *Lacinaria graminifolia pilosa* plants with a similar form of inflorescence.

Fl.—Early September to early October.

Pine Barrens.—Manchester (C), Brindletown, Bamber, Cox's, Brown's Mills (KB), Jones' Mill (S), Cedar Grove (S), Chatsworth, Woodmansie (KB), Atsion (Leeds), Jackson (P), Cedar Brook, Winslow Jnc., Hammon-ton (S), Quaker Bridge (C), Pleasant Mills, Batsto, Egg Harbor City, Mays Landing (C), Woodbine (KB), Elwood (P).

Nabalus albus (L.). White Rattlesnake-Root.

Prenanthes alba Linnæus, Sp. Pl. 798. 1753 [Carolina, Virginia and Pennsylvania].—Britton 155.

Common in the northern counties; rare within our limits and confined to the Middle district.

Fl.—Late August to early October.

Middle District.—Burlington, Mannington (C).

Family AMBROSIACEÆ.

Key to the Species.

- a. Staminate and pistillate flowers in the same heads. *Iva*, p. 725
- aa. Staminate and pistillate flowers in separate heads.
 - b. Pistillate involucre a conspicuous ovoid, spiny bur, leaves rough, irregularly dentate or somewhat lobed.

* Lippincott's Cape May record for *N. virgatus* (KB) proves to be this.

- c. Body of mature bur more than twice as long as thick.
 - d. Beaks of bur straight or nearly so, prickles relatively few. *Xanthium canadense*; p. 726
 - dd. Beaks of bur incurved or hooked, prickles very numerous. *X. commune*, p. 726
- cc. Body of mature bur thick-ovoid, not more than twice as long as thick. *X. echinatum*, p. 726
- bb. Pistillate involucre not conspicuous or prominently spiny.
 - c. Leaves palmately 3-5 lobed, or undivided, plant 10-50 dm. high. *Ambrosia trifida*, p. 725
 - cc. Leaves finely pinnatifid, plant 3-18 dm. high. *Ambrosia artemisiifolia*, p. 725

IVA L.

Iva oraria Bartlett. Marsh Elder.

Iva oraria Bartlett, Rhodora 1906, 26. [Charles River, Boston].

Iva frutescens Britton 142.—Keller and Brown 313.

Common on the salt marshes of the coast, usually bordering the ditches.

This plant, resembling a big coarse Ragweed, borders the edges of the tidal creeks and thoroughfares which intersect the salt marshes in all directions. It is constantly associated with *Baccharis* and *Spartina stricta*.

Fl.—Early August to late September.

Maritime.—Sandy Hook (NB), Long Branch, Forked River, Seaside Park, Barnegat Pier, Surf City (L), Cedar Bonnet (L), Atlantic City, Absecon, Ocean City (S), Piermont, Wildwood, Cape May, Dennisville (S).

AMBROSIA L.

Ambrosia trifida L. Great Ragweed.

Ambrosia trifida Linnæus, Sp. Pl. 987. 1753 [Virginia and Canada].—Knieskern 18.—Britton 143.

Ambrosia trifida integrifolia Britton 143.

Low moist, shady ground; frequent in the Northern and less so in the Middle district, along streams.

Fl.—Late July to early September.

Middle District.—New Egypt, Kaighus Pt., Springdale (S), Woodstown (C), Salem (S).

Ambrosia artemisiifolia L. Ragweed.

Ambrosia artemisiifolia Linnæus, Sp. Pl. 987. 1753 [Virginia and Pennsylvania].—Knieskern 18.—Britton 143.

Common throughout the State as a weed in cultivated ground. It is obviously not native in the Pine Barrens, but its original distribution in the other districts cannot be ascertained.

Fl.—Early August to mid-September.

XANTHIUM L.

***Xanthium canadense* Mill. Cocklebur.**

Xanthium Canadense Miller, Gard. Dict. Ed. VIII. 1768 [Penna. and Maryland].

Occasional in open moist ground of the Middle district.

Fr.—Mid-September into October.

Middle District.—Mt. Holly.

***Xanthium commune* Britton. Clobur.**

Xanthium commune Britton, Man. 912. 1901 [Westport, N. Y.].

Frequent in open moist ground of the Middle district.

Fr.—Mid-September into October.

Middle District.—New Egypt, Camden.

***Xanthium echinatum* Murr. Beach Clobur.**

Xanthium echinatum Murray, Comm. Goett. VI. 32, pl. 4. 1785 [New York].
Keller and Brown 314.

Xanthium strumarium var. *echinatum* Knieskern.—Willis 33.

Xanthium canadense var. *echinatum* Britton 143.

Sand dunes of the sea coast and lower Delaware Bay, common.

Fr.—Mid-September into October.

Maritime.—Forked River, Spray Beach (L), Cedar Bonnet (L), Ocean City, Stone Harbor, Five-Mile Beach, Cape May, Cape May Pt. (S).

Family COMPOSITÆ.

Key to the Species.

a. Flowers all tubular, no flat ray flowers present.

b. Flowers white, greenish or yellow.

c. Shrub with copious white silky pappus in fruit. *Baccharis*, p. 764

cc. Herbs.

d. Flowers white.

e. Woolly, flowers in small, dense heads, with abundant white pappus.

f. Dioecious.

g. Stem 3-9 dm. high, stem leafy.

Anaphalis, p. 767

- gg. Stem 2-4.5 dm. high, leaves mainly basal.
 h. Basal leaves small and narrow, 7-20 mm. long, one nerved.
 i. Spatulate, stolons assurgent, rather leafy throughout, but terminal leaves longest.
Antennaria neodioica, p. 766
 ii. Oblanceolate, stolons procumbent, bractiate, but with leaves only at the tip.
A. neglecta, p. 766
 hh. Basal leaves large and broad, 20-120 mm. long, three or five nerved.
 i. Basal leaves and those at the ends of the stolons bright green and glabrous above.
A. parlinii, p. 767
 ii. Basal leaves and those at the ends of the stolons dull above, with tomentous or arachnoid pubescence.
 j. Heads averaging 7 mm. high.
A. plantaginifolia, p. 766
 jj. Heads averaging 9 mm. high.
A. fallax, p. 766
 ff. Not diœcious, stem upright leafy.
 g. 30-90 cm. high. *Gnaphalium obtusifolium*, p. 767
 gg. 5-20 cm. high. *G. uliginosum*, p. 768
 cc. Plants not wooly.
 f. Flower heads 12-20 mm. high.
 g. Leaves lanceolate or ovate-lanceolate, tapering to the base.
Erechtites, p. 776
 gg. Leaves reniform, or somewhat triangular, often truncate at the base.
 h. Leaves glaucous. *Mesadenia atriplicifolia*, p. 776
 hh. Leaves not glaucous. *M. reniformis*, p. 776
 ff. Flower heads 4-8 mm. high.
 g. Achenes ribbed. *Kuhnia*, p. 739
 gg. Achenes five-angled. *Eupatorium*, p. 732
 dd. Flowers greenish or yellow.
 e. Foliage bristly, heads large. *Carduus spinosissimus*, p. 779
 ee. Foliage not bristly.
 f. Heads green, 2-3 mm. broad in wand-like racemes, leaves finely dissected. *Artemisia*, p. 775
 ff. Heads yellow or greenish, 6-10 mm. broad.
 g. Leaves pinnatifid, achenes without barbed awns.
*[Tanacetum vulgare]*²
 gg. Leaves lanceolate or 3-5 parted, achenes with 2-5 barbed awns.
Bidens, p. 772
 bb. Flowers blue, pink or purple.
 c. A climbing vine with clusters of purplish, inflorescence and triangular leaves, nearly glabrous. *Willughbeya*, p. 739
 cc. Erect herbs.

¹ Tansy, escaped from gardens.

- d. Involucral bracts with hooked bristles, a large course branching plant with purplish flower heads. [*Arctium minus*]¹
- dd. No hooked bristles to the involucral bracts.
- e. Foliage very bristly. *Carduus*, p. 778
- ee. Foliage not bristly.
- f. Leaves verticillate, flowers pink.
- g. Leaves linear, plant 3-6 dm. high, flower head single, 10 mm. wide. *Sclerolepis*, p. 731
- gg. Leaves ovate lanceolate, plant .5-3 m. high, flower heads very numerous in a terminal cymous panicle. *Eupatorium*, p. 732
- ff. Leaves not verticillate.
- g. Flower heads red-purple in a terminal cymose, panicle. Plant 9-27 dm. high, not aromatic. *Vernonia*, p. 730
- gg. Flower heads pink, broad in a terminal corymbose cyme. Plant 4-9 dm. high, aromatic.
- h. Leaves sessile cordate or clasping at base. *Pluchea foetida*, p. 765
- hh. Leaves petioled. *P. camphorata*, p. 765
- ggg. Flower heads red-purple in a long, usually dense, terminal spike or spike-like raceme, leaves linear or linear lanceolate. Plant 3-20 dm. high.
- h. Bracts of the cylindrical involucre oblong or oval obtuse, achenes pubescent or smoothish. *Lacinaria spicata*, p. 740
- hh. Bracts of the obovoid involucre oblong, obtuse or pointed, achenes hairy. *L. graminifolia pilosa*, p. 740
- gggg. Flower heads blue. *Eupatorium*, p. 732
- ggggg. Flower heads purplish, leaves whitish wooly. *Gnaphalium purpureum*, p. 768
- aa. Ray flowers present around the central disc.
- b. Rays yellow.
- c. Notched at the end. *Helenium*, p. 774
- cc. Rays not notched.
- d. No pappus.
- e. Achenes with barbed awns. *Bidens*, p. 772
- ee. Achenes without awns.
- f. Plant rough.
- g. Leaves 3-7 pointed or lobed. *Rubeckia laciniata*, p. 769
- gg. Leaves not lobed.
- h. Disc greenish or yellowish. *Helianthus*, p. 769
- hh. Disc brown.
- i. Flower less than 100 mm. broad.
- j. Leaves linear sessile. *Helianthus angustifolius*, p. 769
- jj. Leaves lanceolate. [*Rubeckia hirta*]²

¹ Burdock, a weed in waste ground.² Black-eyed Susan, a common weed in fields.

- ff. Plant glabrous. *Heliopsis*, p. 768
- dd. Pappus present, heads entirely yellow.
- e. Involucral bracts in one row, heads 15-20 mm. broad, in a terminal corymb, basal leaves numerous.
- f. Leaves and stem wooly. *Senecio tomentosus*, p. 777
- ff. Leaves glabrous or nearly so.
- g. Basal leaves cordate; orbicular or ovate. *S. aureus*, p. 777
- gg. Basal leaves not cordate.
- h. Leaves ovate, flowers large. *S. crawfordi*, p. 777
- ee. Involucral bracts in several rows.
- f. Plant low, woolly or with silky hairs.
- g. Leaves elongate linear, plant woolly. *Chrysopsis falcata*, p. 741
- gg. Leaves oblong or lanceolate, pubescent, with silky hairs, becoming glabrate. *C. mariana*, p. 741
- ff. Plants usually tall, pubescent or glabrous, but not woolly or silky hairy.
- g. Rays more numerous than the disc flowers, leaves linear or linear lanceolate.
- h. Leaves 3-5 nerved.
- i. Branches of the inflorescence and leaves except the veins beneath glabrous. *Euthamia graminifolia*, p. 751
- ii. Branches of inflorescence and leaves pubescent. *E. g. nuttallii*, p. 752
- hh. Leaves 1 nerved. *E. tenuifolia*, p. 752
- gg. Rays not more numerous than the disc flowers. *Solidago*, p. 742
- bb. Rays white.
- c. With pappus.
- d. Pappus very short and scaly. [*Galinsoga parviflora*]¹
- dd. Pappus well developed and feathery.
- e. Bracts in 2-many rows.
- f. Involucre oblong or narrowly campanulate, rays white.
- g. Inflorescence a terminal spike like thyrsus. *Solidago bicolor*, p. 744
- gg. Inflorescence a cymose panicle.
- h. Leaves linear or spatulate entire. *Sericocarpus linifolius*, p. 753
- hh. Leaves oblong or obovate dentate. *S. asteroides*, p. 753
- ff. Involucre turbinate, bracts thin, rays purple, pink or white. *Aster*, p. 754
- ee. Bracts in 1 or 2 series, very narrow.
- f. Flower heads 12-25 mm. broad.
- g. Leaves lanceolate to ovate, heads numerous.

¹ Galinsoga, a weed in waste ground, etc.

h. Leaves lanceolate acuminate.

Doellingeria umbellata, p. 763

hh. Leaves ovate acute. *D. u. humilis*, p. 763

gg. Leaves at least the lower obovate, heads few.

D. infirma, p. 764

ff. Flower heads 4 mm. broad. *Leptilon canadense*, p. 763

cc. No. pappus.

d. Receptacle chaffy.

e. Leaves opposite, lanceolate or oblong. [*Eclipta alba*]¹

ee. Leaves alternate, finely pinnately divided.

f. Heads less than 10 mm. broad.

[*Achillaea millefolium*]²

ff. Heads more than 10 mm. broad. [*Anthemis cotula*]³

dd. Receptacle naked.

e. Head 40-60 mm. broad, leaves spatulate or oblong, dentate.

[*Chrysanthemum leucanthemum*]⁴

ee. Head smaller, leaves lanceolate entire. *Boltonia*, p. 753

bbb. Rays pink or blue.

c. Pappus present.

d. Leaves narrowly linear, very stiff.

Ionactis, p. 764

dd. Leaves not stiff.

e. Bracts of the involuere in 1 or 2 series.

f. Heads over 25 mm. broad. *Erigeron pulchellus*, p. 762

ff. Heads less than 25 mm. broad.

g. Stem leaves nearly all serrate. *E. annuus*, p. 762

gg. Stem leaves narrower, nearly all entire.

E. ramosus, p. 762

ee. Bracts in 2—many series.

Aster, p. 754

cc. No pappus, plants glabrous.

d. Receptacle chaffy, leaves linear, entire. *Corcopsis*, p. 771

dd. Receptacle naked, leaves lanceolate, entire. *Boltonia*, p. 753

VERNONIA Schreber.

Vernonia noveboracensis L. Iron-weed.

Serratula noveboracensis Linnæus, Sp. Pl. 818. 1753 [New York, etc.].

Vernonia noveboracensis Knieskern 17.—Willis 29.—Britton 128.

In open swamps and meadows, common, except in the Pine Barrens, where it is found only on the intruding strips of coast flora which follow up the tidewater streams.

The purple blossoms of the Iron-weed always recall the meadow pastures of Pennsylvania, where clumps of this plant, as

¹ *Eclipta*. Apparently entirely a weed in New Jersey.

² Yarrow.

³ May Weed.

⁴ Ox-eye Daisy. Common weeds of fields, etc.

well as the White and Purple Verbena, Thistle and *Asclepias incarnata* (or *pulchra*), stand out here and there on the close cropped grass, untouched by the cattle which have long since devoured the more succulent and delicate plants. In the wetter spots, where tussocks of *Carex stricta* replace the sod, they are associated with Boneset, Joe Pye Weed, Sunflowers, Asters, Goldenrods, Cardinals and Snakehead, and contribute their share to the riot of color which floods such spots in early autumn.

Precisely similar associations are found in pasture lands of portions of the Middle district of South Jersey and in the coastal swamps, but are entirely absent from the Pine Barrens.

Fl.—Late July to mid-September.

Middle District.—New Egypt, Fish House (S), Camden (P), Oaklyn (S). Lawnside (S), Lindenwold (S), Washington Park, Swedesboro, Pennsgrove, Salem (S), Beaver Dam, Dividing Creek.

Coast Strip.—Forked River, Manahawkin, Opp. Crowleytown (S), Pleasant Mills, Absecon (S), Beesley's Pt. (S), Palermo (S), Mays Landing (S), Cape May Court House, Seaville (S), Cape May (S), Dias Creek, Green Creek (S), South Dennis (S).

SCLEROLEPIS Cassini.

Sclerolepis uniflora (Walt.). *Sclerolepis*.

Ethulia uniflora Walter, Fl. Car. 195. 1788 [Carolina].

Sclerolepis verticillata Willis 29.

Sclerolepis uniflora Britton 128.—Keller and Brown 317.

Sparganophorus verticillatus Pursh, Fl. Am. Sept. II. 518. 1814.

In wet bogs, usually in the water; locally in the Pine Barrens and Cape May peninsula.

This is one of the most interesting composites of the Pines, but so little known that it has apparently never been honored with a popular name. It is a plant of remote wet bogs, the round pink heads reminding one at a distance of English Daisies, while the remainder of the plant would seem to belong to some submerged aquatic.

I well remember my first acquaintance with *Sclerolepis*. It was one of those sultry August days, and we were following the railroad from Woodbine to Belleplain, gaining access in this way to the interior of swamps that would otherwise have been unattainable. The cleared strip on either side of the road-bed was about the limit of our wanderings as the thickets covering

the swamps were with difficulty penetrated. There was an abundance, however, to occupy our attention, for all the choice species seemed to have established themselves in the open. We waded through thick, knee-high vegetation, now splashing through water, now sinking deep into oozing mud. There were beds of white-fringed Orchids and the smaller orange species (*cristata*), Orange and Pink Polygalas, Rhexias from pale pink to deepest magenta, and hosts of sedges, grasses and rushes of perhaps more interest than their more brilliant associates. And in the shallow pools among the shorter sedges grew the *Sclerolepis*, rank upon rank of pink button-like heads, standing clear of the water and supported upon stems whorled with slender leaves, recalling the sterile stem of some *Equisetum*.

Fl.—Mid-July to early September.

Pine Barrens.—Quaker Bridge, Batsto, Hammonton, Egg Harbor City, Woodbine.

Cape May.—Bennett, Cold Spring, Green Creek.

EUPATORIUM L.

Key to the Species.

- a. Flowers blue. *E. coelestinum*, p. 738
- aa. Flowers pink.
 - b. Leaves nearly smooth, inflorescence pyramidal. *E. purpureum*, p. 738
 - bb. Leaves very rugose, inflorescence depressed, flowers usually deeper pink. *E. maculatum*, p. 733
- aaa. Flowers white, leaves usually opposite.
 - b. Bracts of the involucre in 1 or 2 series, all of equal length or nearly so.
 - c. Leaves 50–120 mm. long, sharply dentate. *E. ageratoides*, p. 738
 - cc. Leaves 20–50 mm. long, blunt toothed. *E. aromaticum*, p. 738
 - bb. Bracts imbricated in two or more series, the outer ones shorter.
 - c. Leaves clasping or connate-perfoliate at the base.
 - d. Leaves perfoliate, bracts acute. *E. perfoliatum*, p. 737
 - dd. Leaves clasping, bracts obtuse. *E. resinosum*, p. 737
 - cc. Leaves not clasping nor perfoliate.
 - d. Leaves narrowed at the base.
 - e. Bracts of the involucre acute.
 - f. Leaves linear-lanceolate, sparingly toothed, 4–12 mm. wide. *E. leucolepis*, p. 734
 - ff. Leaves oblong or lanceolate, prominently toothed, 10–40 mm. wide, bracts white, cuspidate.
 - g. Leaves not markedly 3-nerved, teeth coarse. *E. album*, p. 734
 - gg. Leaves 3-nerved, teeth smaller and more regular. *E. album subvenosum*, p. 735

- cc.* Bracts of the involucre obtuse. Leaves linear, crowded usually entire, obtuse. *E. hyssopifolium*, p. 735
dd. Leaves rounded, obtuse or truncate at the base.
e. Plant glabrous, leaves lanceolate, long acuminate. *E. sessilifolium*, p. 736
cc. Plants pubescent, leaves ovate or oblong, acute or obtuse.
f. Leaves ovate-oblong to lanceolate, mostly rounded at the base, usually obtuse, roughish pubescent. *E. verbenæfolium*, p. 735
ff. Leaves roundish ovate, obtuse, truncate at base, downy pubescent, crenate dentate. *E. rotundifolium*, p. 736
fff. Leaves ovate, acute, strongly serrate, pubescent. *E. pubescens*, p. 736

***Eupatorium purpureum* L. Joe-pye Weed.**

Eupatorium purpureum Linnæus, Sp. Pl. 838. 1753 [North America].—Knieskern 17.—Britton 128.

Frequent in low open ground and thickets in the northern counties and less common southward in the Middle and Coast districts.

This is the common Joe-pye weed of the uplands of southeastern Pennsylvania. The typical plant is tall, 6–10 feet, with narrower, often falcate, leaves; crenate, glabrous above and but little veined below, stem glaucous, inflorescence high and rounded on top, flowers pale pink.

The following species, by far the commoner in our region, is low, averaging 3–4 feet; leaves coarsely dentate, shorter and much broader, scabrous above, very strongly veined beneath, inflorescence flat-topped, flowers deep crimson. Specimens growing in shade have the leaves smooth, or nearly so, and are thus intermediate. Possibly the two should be regarded as only subspecifically different, but the extremes are easily separable and the non-typical character of most herbarium material makes it difficult to draw conclusions from it.

Fl.—Mid-August through September.

Middle District.—Hartford, Mouth of Coopers Creek, W. Deptford, Blackwood, Medford (S), Beaver Dam.

Coast Strip.—Palermo.

***Eupatorium maculatum* L. Spotted Joe-pye Weed.**

Eupatorium maculatum Linnæus, Amoen. Acad. IV. 288. 1755 [North America].

Eupatorium purpureum var. *maculatum* Britton 128.

Common in open low ground throughout the State, except in the Pine Barrens.

Fl.—Mid-August through September.

Middle District.—Burlington, Delanco (S), Medford (S), Lindenwold (S), Oaklyn (S), Springdale (S), Lawnside (S), Pennsgrove.

Pine Barrens.—Landisville.

Coast Strip.—Surf City (L), Barnegat City (L), Absecon (S), Atlantic City (T).

***Eupatorium leucolepis* T. & G. White-bracted Boneset.**

Eupatorium leucolepis Torrey and Gray, Fl. N. A. II. 84. 1841 [Pine Barrens, N. J.—La.].—Willis 30.—Britton 129.—Keller and Brown 318.

Frequent in open bogs and swamps of the Pine Barrens and Cape May district and rare on the coast.

Fl.—Early August into September.

Pine Barrens.—Forked River (KB), Manchester (C), Tuckerton (KB) Quaker Bridge, Speedwell (S), Cedar Grove (S), Atco (KB), Cedar Lake, Main Road Sta., Winslow (S), Batsto (S), Pleasant Mills, Hammonton, Egg Harbor City, Woodbine, Belleplain (S).

Coast Strip.—Sherburn's (L).

Cape May.—Sluice Creek (S), Bennett, Cold Spring (S).

***Eupatorium album* L. White Boneset.**

Pl. CXXIII., Fig. 1.

Eupatorium album Linnæus, Mant. III. 1767 ["Pennsylvania—Barthram"] obviously = New Jersey].—Knieskern 17.—Britton 129.—Keller and Brown 319.

Eupatorium glandulosum Barton Fl. Phila. II. 98. 1818.

Eupatorium lanceolatum Barton Fl. Phila., II. 99. 1818.

Common in dry sandy open ground in the Pine Barren, Coast and Cape May districts and occasional in "Pine Barren islands" in the Middle district, occurring north of our limits at South Amboy and South River, Middlesex County.

Fl.—Early August into September.

Middle District.—Atlantic Highlands (C), Keyport (C), New Egypt, Lindenwold, Medford (S), Griffith's Swamp, Bridgeton.

Pine Barrens.—Farmingdale (NB), N. Spring Lake (NB), Bamber, Island H'ts Inc., Speedwell, Quaker Bridge (S), Atsion, Atco, Berlin, Clementon, Albion, Winslow (S), Landisville, Egg Harbor City, Weymouth, Mays Landing (NB), Tuckahoe (S), Woodbine.

Coast Strip.—Forked River (NB), Brant Beach (L), Ship Bottom (L), Holgate's (L), Atlantic City (S), Ocean City (S).

Cape May.—Dennisville, Court House (S).

***Eupatorium album subvenosum* Gray. Few-veined Boneset.**

Eupatorium album var. *subvenosum* Gray, Syn. Fl. I. pt. 2, 98. 1884 [Long Island and New Jersey].—Britton 129.—Keller and Brown 319.

Pine Barrens; not common.

Fl.—Similar to the last.

Pine Barrens.—Atsion (KB), Pleasant Mills (NB), Egg Harbor City.

***Eupatorium hyssopifolium* L. Hyssop-leaved Boneset.**

Eupatorium hyssopifolium Linnæus, Sp. Pl. 836. 1753 [Virginia].—Pursh Fl. Am. Sept. II. 512, 1814. Barton Fl. Phila. II. 98. 1818.—Britton 128.—Keller and Brown 319.

Frequent throughout our region, though more or less local in the Middle district. Not reported in the State from north of our limits.

Fl.—Early August into September.

Middle District.—Keyport (C), Clarksburg (C), New Egypt, Florence, Camden, Lindenwold, Washington Park, Ashland.

Pine Barrens.—Long Branch, Scabright (NB), Forked River, West Creek (S), New Lisbon, Parkdale (S), Atco, Pen Bryn (S), Albion, Clementon, Landisville, Richland, Absecon, Petersburg (S), Tuckahoe (S), Dennisville (S).

Coast Strip.—N. Beach Haven (L), Holgate's (L), Atlantic City (S), Ocean City (S), Piermont (S).

Cape May.—Cold Spring.

***Eupatorium verbenæfolium* Michx. Rough Boneset.**

Eupatorium verbenæfolium Michaux, Fl. Bor. Am. II. 98. 1803 [Carolina].—Keller and Brown 319.

Eupatorium teucrifolium Barton, Fl. Phila. II. 99. 1818.—Willis 30.—Britton 129.

Frequent in low grounds throughout our region and at a few stations in the northern counties.

Fl.—Early August into September.

Middle District.—Keyport (NB), Hartford, Medford, Orchard (S), Westmont (S), Lawnside (S), Lindenwold, Westville, Mickleton, Tomlin, Swedesboro, Dividing Creek.

Pine Barrens.—Pt. Pleasant (NB), Forked River, West Creek, Woodmansie, Speedwell (S), Quaker Bridge, Clementon (S), Bear Swamp (S), Cedar Brook, Landisville, Winslow (S), Hammonton (S), Batsto, Egg Harbor City, Mays Landing (S), Petersburg (S), Tuckahoe (S), Dennisville (S).

Coast Strip.—Spray Beach (L), Atlantic City, Five-Mile Beach.

Cape May.—Bennett (S).

Eupatorium sessilifolium L. Upland Boneset.

Eupatorium sessilifolium Linnæus, Sp. Pl. 837. 1753 [Virginia].—Barton, Fl. Phila. II. 9. 1818.

This species is recorded by Barton from "rocky thickets half a mile east of Woodbury; rare." There seems to be no question about the identity, as his description is clear. The species is frequent in rocky woods of the northern counties.

Eupatorium rotundifolium L. Round-leaved Boneset.

Eupatorium rotundifolium Linnæus, Sp. Pl. 837. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 99. 1818.—Knieskern 17.—Willis 30.—Britton 129.—Keller and Brown 319.

Dry open sandy ground; rather common throughout our region and reported from Franklin, Essex County.

Fl.—Early August into September.

Middle District.—New Egypt, Burlington, Kaighns Pt., Medford (S), Lawnside (S), Lindenwold, Tomlin, Swedesboro.

Pine Barrens.—Long Branch, Forked River, Cain's Mill, Clementon, Landisville, Batsto, Egg Harbor City.

Coast Strip.—Seaside Park, Holgate's (L), Sherburn's (L).

Cape May.—Cold Spring.

Eupatorium pubescens Muhl. Hairy Boneset.

Eupatorium pubescens Muhlenberg and Willdenow, Sp. Pl. III. 1755. 1804 [North America].—Pursh, Fl. Am. Sept. II. 514. 1814.—Willis 30.—Keller and Brown 319.

Eupatorium rotundifolium var. *pubescens* Britton 129.

Eupatorium melissoides Barton, Fl. Phila. II. 99. 1818.

Dry sandy ground; common throughout our region, not reported from the State north of our limits.

Fl.—Early August into September.

Middle District.—Keyport (NB), Burlington, Hainesport, Moorestown (KB), Medford, Lindenwold, Westville, W. Deptford, Tomlin, Mickleton, Swedesboro (CDL), Jericho (T), Dividing Creek.

Pine Barrens.—Sea Girt (C), Toms River (KB), Atsion (Leeds), Clementon (KB), Pen Bryn (S), Landisville (T), New Germany (KB), Hammonton (KB), Egg Harbor City, Tuckahoe (S), Mays Landing (NB), Dennisville (S).

Coast Strip.—Sea Girt (T), Sea Bright (NB), Surf City (L), St. Albans (L), Atlantic City (S), Ocean City (S), Sea Isle City (S), Holly Beach, Anglesea.

Cape May.—Bennett (S).

Eupatorium perfoliatum L. Common Boneset.

Pl. CXXIV.

Eupatorium perfoliatum Linnæus, Sp. Pl. 838. 1753 [Virginia].—Barton, Fl. Phila. II. 101. 1818.—Knieskern 17.—Britton 130.

Low, open grounds, meadows etc.; common except in the Pine Barrens, where it is not found, except as an introduction.

This is a close associate of the Iron-weed and other plants mentioned under that species.

Fl.—Mid-August through September.

Middle District.—New Egypt, Delair, Lawnside (S), Springdale (S), Oaklyn (S), Washington Park.

Pine Barrens.—Landisville (T) (introduced).

Coast Strip.—Sandy Hook (NB), Forked River, Surf City (L), Manahawkin, Ocean City (S), Sea Isle City (S), Wildwood (UP.)

Cape May.—Cold Spring.

Eupatorium resinosum Torr. Resinous Boneset.

Eupatorium resinosum Torrey in D. C. Prodr. V. 176. 1836 [New Jersey].—Knieskern 17.—Willis 30.—Britton 130.—Keller and Brown 320.

Wet bogs of the Pine Barrens.

This is a species which does not associate with the other white Bonesets, unless it be with *E. leucolepis*. It is strictly a Pine Barren species frequenting the great natural bogs in the heart of the region where grow *Xyris congdoni*, *X. fimbriata*, *Eriocaulon decangulare*, *Gyrostachys præcox*, *Helianthus angustifolius*, *Lo-belelia canbyi*, etc., and is not known to occur outside of New Jersey.

At Manahawkin, where the Pine Barren swamps come well out to the coast and the range of this species meets that of *E. perfoliatum*, Mr. Bayard Long has discovered an interesting hybrid between the two.

Fl.—Mid-August into September.

Pine Barrens.—Ocean Beach (C), Manchester (NB), Lakehurst, Forked River, Hornerstown, Toms River, Manahawkin, Whittings (C), Cedar Grove (S), Brown's Mills (KB), Quaker Bridge, Parkdale, Speedwell (S), Atsion, Atco, Malaga (C), Blue Anchor, Ancora (CDL), Bear Swamp (S), Hammon-ton, Batsto, Pleasant Mills, Hospitality Branch, Twelfth St., New Germany (KB), Egg Harbor City, Mays Landing, Absecon.

Eupatorium ageratoides L. f. White Sanicle.

Eupatorium ageratoides Linnæus, Fil. Suppl. 355. 1781 [Canada and Virginia].—Britton 130.

Frequent in rocky woods of the northern counties, rare southward in the Middle district, within our limits.

Fl.—Late August into October.

Middle District.—New Egypt, Vincentown (C), Cooper's Creek (CP), Little Timber Creek (P), Mickleton (C), Swedesboro (CDL).

Eupatorium aromaticum Linn. Smaller White Sanicle.

Eupatorium aromaticum Linnæus Sp. Pl. 839. 1753 [Virginia].—Knieskern 17.—Willis 30.—Britton 130.—Keller and Brown 320.

? *Eupatorium verbenæfolium* Barton, II. 101. 1818.

Sandy woodland of the Middle and Cape May districts, local. Not reported from north of our limits.

Fl.—Early August into September.

Middle District.—Freehold (C), Squan (C), Burlington, Pemberton (C), Ashland (NB), Medford (S), Swedesboro (CDL).

Pine Barrens.—Landisville.

Cape May.—Cape May (S).

Eupatorium cœlestinum L. Mist Flower.

Eupatorium cœlestinum Linnæus, Sp. Pl. 838. 1753 [Carolina and Virginia].—Britton 130.—Keller and Brown 320.

Conoclinium cœlestinum Knieskern 17.

Frequent in open, sandy ground in the Cape May district, and local in the lower Middle district.

This is one of the plants which gives a distinctive character to the flora of Cape May. Nowhere have I seen it so abundant as on the great stretches of open swamp land extending from the city westward to Cape May point, a region where fresh and salt marsh mingle and which is to a great extent ditched and drained to make possible the cutting of the "salt hay," which grows luxuriantly. The haymaking is often in progress in midwinter and forms a rather striking picture for Christmas time.

In late summer these grassy stretches are covered with the pink *Sabatia stellaris*, the purple *Gerardia purpurea*, and the blue misty heads of the present species, making a fine display of color. This plant is often cultivated under the name of *Agrotum*.

Fl.—Early August into September.

Middle District.—Swedesboro.

Cape May.—Court House, Cold Spring, Cape May, Cape May Pt. (S).

WILLUGBÆYA Necker.

Willugbæya scandens (L.). Climbing Boneset.

Pl. CXXII., Fig. 2.

Eupatorium scandens Linnæus, Sp. Pl. 836. 1753 [Virginia].

Mikania scandens Barton, Fl. Phila. II. 102. 1818.—Knieskern 17.—Britton 130.

Frequent in sandy swamps of the Middle, Coast and Cape May districts and at Swartswood Lake, Sussex County, and on the Ramapo River, Bergen Co. Absent from the Pine Barrens, except as a coast intrusion along the large streams.

This is our only trailing composite and is found climbing over low shrubs, its stems twisting tightly around their twigs and branches. The foliage reminds one somewhat of the bind-weeds (*Polygonum*).

Fl.—Early August to late September.

Middle District.—New Egypt, Delaire, Lindenwold, Springdale (S), Medford (S), Blackwood, E. Clementon (S), Kaighns Pt., Camden, Willow Grove.

Pine Barrens?—Landisville.

Coast Strip.—Spring Lake, Barnegat, Cox's, Barnegat City (L.), Surf City (L), Mays Landing (S), Ocean City (S), Palermo (S), Piermont, Wildwood.

Cape May.—Green Creek, Cold Spring (S), Court House, Cape May (S).

KUHNIA L.

Kuhnia eupatorioides L. False Boneset.

Kuhnia eupatorioides Linnæus, Sp. Pl. Ed. 2. 1662. 1763 [Pennsylvania].—Willis 30.—Britton 130.—Keller and Brown 320.

Limestone rocks on the upper Delaware and in sandy woods near New Brunswick, and at several stations in the Middle district within our limits.

Fl.—Early August to mid-September.

Middle District.—Birmingham (NB), Medford, Locust Grove (S).

LACINARIA HILL.*

Lacinaria spicata (L.). Button Snakeroot.

Serratula spicata Linnæus, Sp. Pl. 819. 1753 [North America].

Liatris spicata Knieskern 17.—Willis 29.—Britton 131.

Lacinaria spicata Keller and Brown 321.

Frequent; open moist ground in the northern counties and occasional in the Middle district within our limits. Rare on the Coast strip.

The statement in Keller and Brown's List that this species is common in the Pine Barrens is an error, as we have no record from that district. The species of that region is the following.

Fl.—Mid-August to late September.

Middle District.—Squan (C), New Egypt, Griffith's Swamp (C), Gloucester Co., Mickleton (C).

Coast Strip.—Bay Head, Pt. Pleasant (C), Manahawkin.

Lacinaria graminifolia pilosa (Ait.). Hairy Button Snakeroot.

Serratula pilosa Aiton, Hort. Kew. III. 138. 1789 [North America].

Liatris pilosa Pursh, Fl. Am. Sept. II. 508. 1814.

Liatris graminifolia dubia Knieskern 17.—Willis 29.—Britton 131.

Lacinaria graminifolia pilosa Keller and Brown 321.

Common in sandy ground in the Pine Barrens, Coast Strip and Cape May peninsula, and locally in the Middle district in so-called "Pine Barren islands." The true *graminifolia* does not occur in the State, and the contrary statements in Willis' and Britton's Catalogues prove to be erroneous.

The wand-like spikes of purple blossoms of the Button Snake root are to be seen on every hand in the Pine Barrens in late summer and early autumn. The general resemblance to the spikes of *Aster concolor* is rather striking.

Fl.—Early August to late September.

Middle District.—Clementon, Lindenwold.

Pine Barrens.—Forked River, Manchester, Brown's Mills (T), Whitings (S), Jones' Mill (S), Speedwell (S), Taunton, Clementon, Atco, Atsion,

* *Lacinaria scariosa* (*Serratula scariosa* Linn., Sp. Pl. 818—Virginia) is recorded in Britton's Catalogue from Keyport and near Newfoundland "evidently rare." There are no specimens in the State herbarium, and I know of no further evidence of the plant occurring in New Jersey.

The record for Hammonton in Keller and Brown's list was an error.

Albion, Winslow, Landisville, Malaga (S), Hammonton, Batsto, Quaker Bridge (S), Egg Harbor City, Absecon, Tuckahoe (S), Dennisville (S).

Coast Strip.—Beach Haven Terrace (L), West Creek (S), Atlantic City (S), Piermont, Anglesea.

Cape May.—Bennett, Cape Pt. (S).

CHRYSOPSIS Nuttall.

Chrysopsis falcata (Pursh.). Sickie-leaved Golden Aster.

Inula falcata Pursh, Fl. Am. Sept. 532. 1814 [New Jersey].

Inula (Chrysopsis) mariana b. *falcata* Nuttall, Gen. II. 151. 1818.

Chrysopsis falcata Knieskern 18.—Willis 32.—Britton 131.—Keller and Brown 321.

Locally in dry sands of the Pine Barrens; not common.

This plant prefers bare open stretches of white sand, where *Arenaria caroliniana*, *Lechea racemulosa* and *Hudsonia ericoides* are found. Many such areas around the sites of former forges or wayside inns are now appropriated by these plants, such as at Quaker Bridge, Speedwell, etc.

Fl.—Early July to early September.

Pine Barrens.—Toms River, Speedwell, Atsion, Quaker Bridge, Batsto, Hammonton.*

Chrysopsis mariana (L.). Golden Aster.

Inula Mariana Linnæus, Sp. Pl. Ed. 2. 1240. 1763 [North America].—Pursh, Fl. Am. Sept. II. 531. 1814.

Chrysopsis mariana Knieskern 18.—Britton 132.

Dry sandy ground; common in the Pine Barrens and Cape May district and locally in the Middle district, occurring north of our limits only at a few stations in Mercer and Middlesex Counties and near Morristown.

Fl.—Early August to early September.

Middle District.—New Egypt, Hartford, Medford (S), Locust Grove (S), Westville, W. Deptford, Camden, Beaver Dam, Dividing Creek.

Pine Barrens.—Long Branch, Forked River, Cedar Grove (S), Clementon, Pen Bryn (S), Ashland, Albion, Atco, Cedar Brook, Kenilworth (S), Landisville (T), Quaker Bridge, Batsto, Pleasant Mills, Tuckahoe, Egg Harbor City, Dennisville (S).

Cape May.—Cape May.

* The record given in Keller and Brown's list for Atlantic City is an error, there is no such specimen in the Botanical Club collection.

CHONDROPHORA Nuttall.

Chondrophora nudata (Michx.). Rayless Goldenrod.

Chrysocoma nudata Michaux, Fl. Bor. Am. II. 101. 1803 [Carolina].*Chrysocoma virgata* Nuttall, Gen. II. 137. 1818 [New Jersey].*Bigelovia nudata* Willis 32.—Britton 133.*Bigelovia nudata* var. *virgata* Britton 132.

The occurrence of this species in the State seems to be based upon the statement of Willis that it is found at Blue Bell, Monmouth Co., and of Gray that it occurs in "low pine barrens." Both are based in all probability upon Nuttall's record of *C. virgata*, which they regarded as identical with *nudata*.

The form known as *virgata* was described by Nuttall from "the borders of swamps in New Jersey near the sea coast." He adds that it is "nearly allied to *C. nudata*, but distinct, and resembles more *Solidago tenuifolia*, with which it might easily be confounded." Notwithstanding the fact that New Jersey is the type locality for *virgata*—in fact the only locality mentioned—the name is used, probably rightly, for a southern plant in Britton and Brown's Illustrated Flora and other works. The type labelled "New Jersey" is still preserved in the herbarium of the Philadelphia Academy, but doubtless the label is the result of a slip of memory on Nuttall's part. For a further discussion of the probability of Nuttall's type coming from elsewhere cf. Harper Torrey 1911, 92.

SOLIDAGO L.

Key to the Species.

- a. Tips of the involucre bracts erect and appressed.
 - b. Heads in axillary clusters, or also in a terminal spike-like thyrsus (usually simple, rarely branched).
 - c. Heads chiefly in axillary clusters, achenes pubescent.
 - d. Leaves lanceolate or oblong. *S. asia*, p. 744
 - dd. Leaves broadly oval, contracted into margined petioles. *S. flexicaulis*, p. 744
 - cc. Heads chiefly in a terminal, spike-like thyrsus, achenes glabrous or nearly so.
 - d. Rays white, stem pubescent. *S. bicolor*, p. 744
 - dd. Rays yellow, stem glabrous or nearly so. *S. erecta*, p. 745
 - bb. Heads entirely in a terminal simple, or branched, spike-like thyrsus.
 - c. Bracts of the involucre acute. *S. puberula*, p. 745
 - cc. Bracts obtuse.

- d. Upper leaves abruptly smaller and appressed. *S. stricta*, p. 746
 dd. Upper leaves becoming gradually smaller, not appressed.

S. speciosa

- bbb. Heads in a terminal, usually large panicle; secund on its spreading or recurved branches.

c. Plant maritime, leaves thick, fleshy, entire. *S. sempervirens*, p. 746

cc. Plants not maritime, leaves not fleshy.

d. Leaves pinnately veined, not triple nerved.

e. Leaves all entire, thin and glabrous, lanceolate.

S. odora, p. 747

ce. Leaves, at least the lower ones, dentate or serrate.

f. Stem densely pubescent, leaves more or less so.

g. Leaves rugose, veiny, sharply serrate.

S. rugosa, p. 747

gg. Leaves not rugose, only sparingly dentate, some entire.

S. fistulosa, p. 748

ff. Stem glabrous, puberulent, or pubescent only above.

g. Leaves very scabrous on the upper surface, serrulate.

S. patula, p. 748

gg. Leaves smooth, or minutely pubescent on the upper surface.

h. Racemes few, very slender, widely divergent.

S. ulmifolia, p. 748

hh. Racemes numerous, spreading, recurved or ascending.

i. Leaves all oblong or oblong lanceolate, sessils.

S. elliotii, p. 748

ii. Lower leaves, at least, petioled; lanceolate or ovate lanceolate.

j. Leaves thin, lower cauline and basal leaves abruptly narrowed to the petioled base. Heads 5-7 mm. high.

S. arguta, p. 750

jj. Leaves firm, lanceolate or ovate lanceolate, tapering gradually to the base.

k. Panicle usually as broad as high, rays 8-12.

S. juncea, p. 750

kk. Panicle usually longer than broad.

l. Plant more robust, leaves broader, rays 3-8.

S. neglecta, p. 749

ll. Plant slender, leaves narrower, rays 2-5.

S. uniligulata, p. 750

dd. Leaves triple nerved (i. e., a pair of lateral veins stronger than the others).

e. Lower leaves much longer than the reduced upper ones, leaves firm, whole plant whitish with close puberulence.

S. nemoralis, p. 751

ce. Leaves essentially uniform from base to summit, lanceolate, not whitish.

- f. Involucre 2-2.8 mm. long, stem glabrous below, pubescent above, leaves glabrous above, pubescent on the veins beneath, mostly sharply serrate.

S. canadensis, p. 751

- ff. Involucre 3.2-5 mm. long.

- g. Stem closely and minutely pubescent throughout, leaves minutely pubescent above, short pilose beneath, toothed.

S. altissima, p. 751

- gg. Stem glabrous throughout (sometimes pubescent in the inflorescence).

- h. Leaves quite smooth on both sides.

S. serotina, p. 750

- hh. Leaves slightly pubescent beneath, especially on the nerves.

S. serotina gigantea, p. 750

Solidago cæsia L. Blue-stemmed Goldenrod.*

Solidago casia Linnæus, Sp. Pl. 879. 1753 [North America].—Willis 31.—Britton 132.

In woods; frequent in the northern counties, much less common southward in the Middle and Cape May districts only.

Fl.—Late August to early October.

Middle District.—New Egypt, Westmont (S), Mickleton (NB), Swedesboro.

Cape May.—Cape May (S).

Solidago flexicaulis L. Zig-zag Goldenrod.

Solidago flexicaulis Linnæus, Sp. Pl. 879. 1753 [Canada].

Solidago latifolia Willis 31.—Britton 132.

In woods; frequent in the northern counties, very rare within our limits and confined to the Middle district.

Fl.—Late August to early October.

Middle District.—New Egypt, Camden Co. (C).

Solidago bicolor L. White Goldenrod.

Solidago bicolor Linnæus, Mantissa 114. 1767 [North America].—Knieskern 18.—Britton 132.

Dry woods and open sandy ground; frequent throughout the State. The only white Goldenrod.

Fl.—Late August to early October.

*The record of *S. squarrosa* for Westville (KB) was an error for Westtown, Pa.

Middle District.—New Egypt, Orchard (S), Haddonfield.

Pine Barrens.—Forked River, Cedar Brook, Malaga, Landisville (T), Egg Harbor City, Absecon, Dennisville (S).

Cape May.—Bennett (S).

***Solidago erecta* Pursh. Slender Goldenrod.**

Solidago erecta Pursh., Fl. Am. Sept. 542. 1814 [North America].—Keller and Brown 323.

Solidago speciosa var. *angustata* Britton 133.

Frequent in the Pine Barrens and Cape May peninsula, rare and local in the Middle district.

This species has been very generally confused with *S. hispida* Muhl (= *S. bicolor* var. *concolor* T. and G.) and the records given for that species in the several lists of southern New Jersey plants really refer to this, as shown by many of the actual specimens upon which the records were based. *S. hispida* does not occur within our limits so far as I have been able to ascertain.

Solidago erecta is often associated with and resembles in general way *S. puberula*, but can readily be distinguished by the blunt bracts of the involucre, which contrast with the acute bracts of the latter species.

Fl.—Early August to late September.

Middle District.—Lindenwold.

Pine Barrens.—Forked River, West Creek (S), Taunton (S), Atsion (C), Clementon, Malaga (S), Albion, Winslow (P), Pen Bryn (S), Middletown, Hammonton, Egg Harbor City, Mays Landing (S), Palermo (S), Seaville (S).

Cape May.—Court House (S), Bennett (S).

***Solidago puberula* Nutt. Downy Goldenrod.**

Solidago puberula Nuttall, Gen. II. 162. 1818 [near Amboy, N. J.].—Willis 31.—Britton 133.—Keller and Brown 323.

Frequent in the Pine Barrens and Cape May peninsula, and occasional in the Middle district.

Fl.—Early September to early October.

Middle District.—Keyport (Bassett), New Egypt, Pemberton (KB), Mantua (KB), Lindenwold, Dividing Creek (S).

Pine Barrens.—Toms River (KB), West Creek (S), Woodmansie, Browns Mills Inc. (KB), Atsion, Whitings (S), Clementon, Taunton, Jackson, New Germany (KB), Landisville, Hammonton (S), Egg Harbor City, Absecon (KB), Mays Landing (KB), Tuckahoe.

Cape May.—Bennett (S).*

* Lippincott's record for Anglesea (KB) proves to belong to *S. fistulosa*.

***Solidago stricta* Ait. Wand-like Goldenrod.**

Solidago stricta Aiton, Hort. Kew III. 216. 1787 [North America].—Pursh, Fl. Am. Sept. II. 540. 1814.—Britton 133.—Keller and Brown 323.

Damp, sandy spots in the Pine Barrens, finding here the northern limit of its range.

A species of the east central or most typical portion of the Pine Barrens coming down in some spots, as at West Creek, quite to the edge of the salt marshes.

Fl.—Mid-August to late September.

Pine Barrens.—Forked River, West Creek (S), Cox's, Woodmansie (KB), Jones Mill (S), Atsion (C), Quaker Bridge (P), Winslow (C), Hammon-ton, Egg Harbor City.*

***Solidago sempervirens* L. Sea-side Goldenrod.**

Pl. CXXII., Fig. 1.

Solidago sempervirens Linnæus, Sp. Pl. 878. 1753 [New York and Canada].—Knieskern 18.—Willis 31.—Britton 133.—Keller and Brown 324.

Common along the salt marshes of the coast and up the Delaware, casually to Camden; also along the tidewater creeks for some miles back into the Pine Barrens. Occasionally introduced inland along railroads.

This great fleshy-leaved Goldenrod is probably the handsomest species of the genus. It abounds in all sorts of situations along the coast and is one of the most conspicuous of the autumnal flowers. I have found some sprays still in bloom on Thanksgiving Day.

Fl.—Early September to early October, sporadically later.

Maritime.—Sandy Hook, Seaside Park, Barnegat Pier, Island Heights Inc., Spray Beach (L), Barnegat, West Creek (S), Absecon, Atlantic City, Ocean City, Palermo (S), Sea Isle Inc. (S), Anglesea, Wildwood, Cold Spring (S), Bennett, Cape May, Cape May Pt. (S), Dennisville (S).

Middle District.—Camden.

Pine Barrens.—Whitings, Landisville, Richland (T), Winslow (T), Pleasant Mills.

* The record given by Keller and Brown on authority of the late U. C. Smith for Anglesea cannot be verified, and seems extremely unlikely.

***Solidago odora* Ait. Fragrant Goldenrod.**

Pl. CXXVI.

Solidago odora Aiton, Hort. Kew. III. 214. 1789 [N. America].—Barton, Fl. Phila. II. 121. 1818.—Knieskern 18.—Britton 135.

In dry woods; frequent throughout our region, especially in the Pine Barrens and occasional in the northern counties.

This species, *S. fistula*, *rugosa*, *neglecta*, *erecta* and *puberula* are the most generally distributed Goldenrods of the Pine Barrens, although none of them are restricted to the region, as is the more local *S. stricta*.

S. odora is the first to bloom and is found in dry, open, swampy woods, associated with *Helianthus divaricatus*, *Ionactis linarii-folius*, *Sericocarpus asteroides*, *S. linifolius*, etc.

The natives were accustomed in old days to make a very pleasant "tea" from the leaves.

Fl.—Mid-July to late August.

Middle District.—New Egypt, Burlington, Wenonah, Clementon, Mickleton (NB), Dividing Creek.

Pine Barrens.—Quaker Bridge (NB), Bear Swamp (S), Waterford, Winslow (S), Landisville, Egg Harbor City, Mays Landing, Tuckahoe (S), Manumuskin (S).

Coast Strip.—Barnegat City (L), Surf City (L), N. Beach Haven (L).

Cape May.—Cold Spring (S), Bennett.

***Solidago rugosa* Mill. Wrinkle-leaved Goldenrod.**

Solidago rugosa Miller, Gard. Dict. Ed. 8. No. 25. 1768 [Cultivated plant].—Barton, Fl. Phila. II. 123. 1818.—Britton 134.

Fields and thickets; common throughout the State, except in the Pine Barrens, where it is only occasional.

Prof. Fernald has identified specimens from Mickleton and Egg Harbor City as *S. aspera* Ait. but I cannot regard the characters cited in the New Gray's Manual as of sufficient constancy or weight to warrant the separation of this form from *S. rugosa*, even as a subspecies.

Fl.—Late August to late September.

Middle District.—Farmingdale, New Egypt, New Lisbon (P), Brown's Mills (P), Delanco (S), Medford (S), Clementon (S), Lawnside (S), Washington Park, Mickleton, Salem (S), Beaver Dam, Dividing Creek.

Coast Strip.—Forked River, Manahawkin, Barnegat City (L), Ship Bottom (L), Atlantic City (S), Wildwood, Tuckahoe (S).

748 REPORT OF NEW JERSEY STATE MUSEUM.

Cape May.—Fishing Creek (OHB), Cold Spring (S), Bennett.

Pine Barrens.—Landisville, Egg Harbor City.

***Solidago fistulosa* Mill. Pine Barren Goldenrod.**

Solidago fistulosa Miller, Gard. Dict. Ed. 8. No. 19. 1768 [North America].—

Keller and Brown 324.

Solidago pilosa Britton 135.

Frequent in swamps of the Pine Barren, Coast and Cape May districts, and occasional in the lower Middle district.

Fl.—Late August to late September.

Middle District.—Haddonfield (KB), Clarksboro, Mickleton (KB), Swedesboro, Beaver Dam.

Pine Barrens.—Bay Head (C), Toms River (NB), Forked River, West Creek (S), Woodmansie (KB), Atsion, Cedar Grove (S), Landisville, Eighth St. Hospitality Br., Malaga (P), Hammonton (KB), Egg Harbor City, Palermo, Tuckahoe, Sea Isle Jnc. (S).

Coast Strip.—Seaside Park, Barnegat Pier, Brant Beach (L), Barnegat City (L), Peahala (L), Holgate's (L), Ocean City (S), Piermont (S), Anglesea, Cape May (S).

***Solidago patula* Muhl. Rough-leaved Goldenrod.**

Solidago patula "Muhlenberg" Willdenow, Sp. Pl. III. 2059. 1804 [Pennsylvania].—Willis 31.—Britton 134.—Keller and Brown 324.

In swampy ground; locally in the northern counties, but very rare within our limits and confined to the Middle district.

Middle District.—Freehold (C), Mickleton (NB).

***Solidago ulmifolia* Muhl. Elm-leaved Goldenrod.**

Solidago ulmifolia "Muhlenberg" Willdenow, Sp. Pl. III. 2060. 1804 [Pennsylvania].—Barton, Fl. Phila. II. 120. 1818.—Knieskern 18.—Britton 134.

In woods and thickets; frequent in the northern counties, but apparently rare within our limits and confined to the Middle and Coast districts.

Fl.—Mid-August to late September.

Middle District.—Griffith's Swamp.

Coast Strip.—Cox's, Manahawkin.

***Solidago elliottii* T. & G. Elliott's Goldenrod.**

Solidago Elliottii Torrey and Gray, Fl. N. A. II. 218. 1841 [Cape Fear River, N. C., to Ga.].—Britton 135.—Keller and Brown 324.

Rare and local; mainly confined to the coast region, but obtained by Parker at Brown's Mills and reported by Britton

from Mercer, Bergen and Hudson Counties. I have examined Parker's specimen and confirmed his identification, but the other records given by Britton I have been unable to verify.

Fl.—Early September to early October.

Middle District.—Brown's Mills (P), Gloucester County.

Pine Barrens?—Landisville.

Coast Strip.—Manahawkin.

Cape May.—North Cape May.

***Solidago neglecta* T. & G. Swamp Goldenrod.**

Solidago neglecta Torrey and Gray, Fl. N. A. II. 213. 1841 [Mass. and N. Y. to N. C. and Ind.].—Britton 133.—Keller and Brown 324.

Frequent in bogs and swamps of the Pine Barren and Cape May districts, more especially near the coast and occasional in the Middle district; reported from a few stations in Middlesex, Bergen and Morris Counties north of our limits.

This is the most common Goldenrod in swamps and bogs of the Pine Barrens and is subject to considerable variation. On the one hand it seems to pass by almost imperceptible gradations into the slender few rayed form that has been identified as *S. uniligulata*, while on the other it shows a tendency to *S. speciosa*. All records of the latter from our region prove to be *S. neglecta*, where specimens are extant, but it is possible that *S. speciosa* does grow in some of the bogs of the Middle district.

Indeed Nuttall's original specimens of *S. speciosa* came from "sandy woods, banks of the Schuylkill, also in New Jersey, but rare," and Barton gives "*S. petiolaris* (=speciosa Nutt) one mile east of Woodbury, seven feet high."

At Lindenwold I have collected specimens with spike-like racemes not at all one-sided, but side by side with them was typical secund *S. neglecta*, absolutely identical in all other respects. In the same neighborhood, too, I collected a hybrid *Solidago*, in which the *S. neglecta* strain is apparently present.

Fl.—Late August to early October.

Middle District.—Lindenwold, Mickleton, Swedesboro.

Pine Barrens.—Waretown, Browns Mills (KB), Clementon, Barnegat, Manahawkin, West Creek (S), Tuckerton (KB), Quaker Bridge (KB), Cedar Brook, Hammonton (S), Eighth St., Hospitality Br., Petersburg (S), Tuckahoe (S).

Cape May.—Ocean City Jnc. (S), Goshen (S), Cape May (OHB).

***Solidago uniligulata* (D.C.). Few-rayed Goldenrod.**

Bigelovia (?) *uniligulata* D. C. Prodr. V. 329. 1836 [New Jersey and Virginia to Carolina].

Solidago neglecta var. *uniligulata* Britton 133.

Pine Barren swamps near the coast and at one station in the Middle district.

This species is not clearly separable from *S. neglecta*, so far as I can judge, from rather scanty material, and seems to form one extreme of a series with typical *neglecta* at the other.

Fl.—Early September to mid-October, apparently.

Middle District.—Two mi. N. W. of Mickleton.

Pine Barrens.—Ferago (L), Toms River (P), Forked River, Waretown, Tuckahoe (S).

***Solidago juncea* Ait. Early Goldenrod.**

Solidago juncea Aiton, Hort. Kew. III., 213. 1789 [North America].—Britton 134.

Very scarce in our limits, more common northward.

Fl.—Mid-July to early September.

Middle District.—Two miles North of Mickleton, Lindenwold.

***Solidago arguta* Ait. Cut-leaved Goldenrod.**

Solidago arguta Aiton, Hort. Kew. III., 213. 1789 [North America].—Britton 134.—Keller and Brown 325.

Frequent or occasional in woods of the northern counties and very rare southward in the Middle district.

Middle District.—Two miles N. W. Mullica Hill (NB).

A beautiful tall Goldenrod with large heads and open inflorescence growing plentifully in a strip of woodland below Atlantic City, where I collected it September 4, 1908, seems different from anything else that I have seen. Prof. Fernald suggests a hybrid between *S. arguta* and *S. neglecta*, but unfortunately neither is present on the island.

***Solidago serotina* Ait. Late Goldenrod.**

Solidago serotina Aiton, Hort. Kew. III. 211. 1789 [North America].—Knieskern 18.—Britton 135.

Frequent in rich soil in thickets, etc., in the Northern, Middle and Coast districts. Some are referable to *S. s. gigantea*, which is doubtfully separable.

Fl.—Early August to late September.

Middle District.—Delanco, Kaighn's Pt., Fish House, Washington Park, Mickleton, Swedesboro.

Coast Strip.—Island Heights Jnc., Pleasant Mills.

***Solidago altissima* L.* Tall Goldenrod.**

Solidago altissima Linnæus, Sp. Pl. 878. 1753 [N. America].—Knieskern 18.

Solidago canadensis Britton 135 (in part).

Frequent in the northern counties, occasional on the Coast strip, and probably in the Middle district. Apparently all our material is *altissima*. All specimens labelled *canadensis* that we have examined prove to be this.

Fl.—Late August to early October.

Middle District.—New Egypt, Mickleton, Swedesboro.

Coast Strip.—Manahawkin, Spray Beach (L), Cold Spring (S), Anglesea (OHB), Cape May (OHB).

***Solidago nemoralis* Ait.† Field Goldenrod.**

Solidago nemoralis Aiton Hort. Kew. III. 213. 1789 [North America].—Knieskern. 18.—Britton 135.

Dry, open ground; frequent throughout the State.

This species, more than any other of Goldenrod, shows a tendency to become a weed, and old fields and abandoned garden patches are often largely grown up with this *Solidago* associated especially with *Gnaphalium obtusifolium*.

Fl.—Mid-August to late September.

Middle District.—New Egypt, Haddonfield, Lawnside (S), Mickleton, Swedesboro, Salem (S), Beaver Dam.

Pine Barrens.—Forked River, Albion, Cedar Brook, Atco, Landisville, Egg Harbor City.

Coast Strip.—Manahawkin, Barnegat City (L), Spray Beach (L), Surf City (L), Ship Bottom (L), Atlantic City (S), Seaville (S), Wildwood, Cold Spring (S).

EUTHAMIA Nuttall.

***Euthamia graminifolia* (L.). Bushy Goldenrod.**

Chrysocoma graminifolia Linnæus, Sp. Pl. 841. 1753 [Canada].

Solidago lanceolata Britton 325.

* Cf. Fernald *Rhodora* 1908, 91, for a discussion of this species.

† The record of *S. rigida* at Egg Harbor City, given by Keller and Brown, on authority of C. S. Williamson, I am informed by Mr. Williamson was an error.

In moist open ground along the coast and perhaps common northward.

Fl.—Late August to early October.

Coast Strip.—Sandy Hook, Sea Girt, Spray Beach (L), Ship Bottom (L), Surf City (L), Beach Haven (L), Atlantic City (S), Tuckahoe (S).

***Euthamia graminifolia nuttallii* (Greene). Nuttall's Goldenrod.**

Euthamia Nuttallii Greene, Pittonia V: 73. 1902 [Potomac Valley, Va., and Md.].

Moist, open ground; apparently common, except in the Pine Barrens and Coast Strip.

Fl.—Late August to early October.

Middle District.—New Egypt, Hartford, Delair, Washington Park, Lawnside (S), Pennsgrove, Mickleton (NB), Beaver Dam, Dividing Creek.

Pine Barrens.—Landisville.

Cape May.—Bennett, Cold Spring (S), Cape May.

Euthamia floribunda Greene, Pittonia V., 74, 1902, was described from an apparently unique specimen obtained by J. H. Holmes at Pt. Norris, N. J., and was renamed *polycephala* by Fernald, Rhodera 1908: 92. Extremes of this plant, which has been since found at several stations, seem rather distinct, but others are intermediate and it is probably an individual variation of the last. A typical specimen is in the Philadelphia Academy collection from New Egypt, collected by J. H. Grove.

***Euthamia tenuifolia* (Pursh.). Slender Bushy Goldenrod.**

Solidago tenuifolia Pursh, Fl. Am. Sept. II. 540. 1814 [Pine Barrens, N. J.-Carolina].—Nuttall, Gen. II. 162. 1818.—Barton, Fl. Phila. II. 122. 1818.—Knieskern 18.

Solidago Caroliniana Britton 135.

Euthamia Caroliniana Keller and Brown 325.

Frequent throughout our region, and at New Durham, Hudson Co., and Trenton, Mercer Co., north of our limits.

A beautifully delicate species, especially abundant along the coast and conspicuous in the flower show of early autumn.

Fl.—Late August to early October.

Middle District.—Delanco (S), Kaighns Pt., Camden, Ashland, Mickleton, Medford (S).

Pine Barrens.—Island Heights Jnc., West Creek (S), Quaker Bridge, Clementon, Albion, Hammonton (S), Landisville, Egg Harbor City, Tuckahoe (S).

Coast Strip.—Barnegat, Cox's, Surf City (L), Ship Bottom (L), Barnegat City (L), Spray Beach (L), Atlantic City (S), Avalon, Wildwood.

Cape May.—Bennett, Cold Spring (S), Cape May.

BOLTONIA L'Heritier.

Boltonia asteroides (L.). Aster-like Boltonia.

Matricaria asteroides Linnæus, Mantissa 116. 1767 [Pennsylvania "Barthram"].

Boltonia asteroides Long, Torrey 1908, 16.

Open swamps in the southwestern part of the Cape May peninsula. First discovered in a swamp west of Bennett by Mr. Bayard Long July 24, 1907, and later found by the writer near Green Creek. Like many other plants peculiar to the Cape May region, it pushes up the Susquehanna Valley into Pennsylvania.

Fl.—Mid-August to mid-September.

Cape May.—Bennett, Green Creek.

SERICOCARPUS Nees.

Sericocarpus linifolius (L.). Narrow-leaved White-top Aster.

Conyza linifolia Linnæus Sp. Pl. 861. 1753 [North America].

Aster Solidaginoides Barton, Fl. Phila. II. 109. 1818.

Sericocarpus solidagineus Knieskern 17.—Willis 30.

Sericocarpus linifolius Britton 136.—Keller and Brown 326.

Frequent in dry sandy woods of the Pine Barrens, also occasional in similar situations in the Cape May and Coast districts, and locally in the Middle district, ranging north of our limits to a few stations in Bergen, Middlesex, Hunterdon and Mercer Counties.

Fl.—Mid-June to mid-August.

Middle District.—Shark River, Farmingdale (S), Mickleton (C).

Pine Barrens.—Brindletown, Bamber, Manahawkin, Chatsworth, Speedwell (S), Atsion, Cedar Brook, Inskip, Folsom, Landisville, Richland (NB), Hammonton (C), Egg Harbor City, Tuckahoe (S).

Coast Strip.—Anglesea.

Cape May.—Fishing Creek.

Sericocarpus asteroides (L.). White-top Aster.

Conyza Asteroides Linnæus, Sp. Pl. 861. 1753 [North America].

Aster conyzoides Barton, Fl. Phila. II. 109. 1818.

Aster conyzoides var. *plantaginifolius* Nuttall Gen. II. 158. 1818.

Sericocarpus conyzoides, Knieskern 17.

Sericocarpus asteroides Britton 326.

Common in dry woods throughout the State.

Fl.—Late June to early August.

Middle District.—Farmingdale, New Egypt, Arney's Mt. (S), Haddonfield (S), Swedesboro.

Pine Barrens.—New Lisbon, Clementon, Cedar Brook, Winslow (S), Inskip, Landisville.

Coast Strip.—Ship Bottom (L), Atlantic City (S).

Cape May.—Cape May (S).

ASTER L.

Key to the Species.

- a. Basal and some of the lower stem leaves cordate and slender petioled.
 - b. None of the stem leaves cordate clasping.
 - c. Rays white, plant not glandular. *Aster divaricatus*, p. 755
 - cc. Rays violet, plant glandular. *A. macrophyllus*, p. 755
 - ccc. Rays blue or purple, plant not glandular. *A. cordifolius*, p. 755
 - bb. Stem leaves, or some of them, cordate, clasping, rays violet or pale blue. *A. undulatus*, p. 756
- aa. No cordate and petioled leaves, but some at least of the stem leaves with more or less cordate or auricled clasping bases.
 - b. Stem rough or hirsute pubescent.
 - c. Leaves entire, oblong, linear or lanceolate.
 - d. Stem rough, leaves oblong to oval. *A. patens*, p. 756
 - dd. Stem hirsute, leaves lanceolate, clasping by an auriculate base. *A. novæ-angliæ*, p. 756
 - cc. Leaves, at least the lower, serrate, stem hispid pubescent. *A. puniceus*, p. 757
- bb. Stem glabrous.
 - c. Leaves sharply serrate, lanceolate to oblong-lanceolate sessile. *A. lævis*, p. 757
 - cc. Leaves entire or nearly so. *A. novi-belgii*, p. 757
- aaa. Leaves not at all clasping.
 - b. Leaves silvery canescent on both sides, heads in a narrow raceme. *A. concolor*, p. 757
 - bb. Leaves not silvery canescent.
 - c. Rays blue, pink or purple, head more than 20 mm. broad (except *gracilis*).
 - d. Tips of the involucre bracts widely spreading.
 - e. Heads 25 mm. broad. *A. spectabilis*, p. 758
 - ee. Heads 12–18 mm. broad. *A. gracilis*, p. 758
 - dd. Tips of the involucre bracts erect and appressed; heads 25–35 mm. broad.
 - e. Bracts coriaceous, oblong-spatulate, or oblong, leaves sessile, oblong lanceolate, rough above, somewhat pubescent beneath, sharply serrate, broad. *A. radula*, p. 759
 - ee. Bracts linear, subulate, membranaceous, acute; leaves sessile, membranaceous, oblong lanceolate, puberulent, dentate or entire. *A. nemoralis*, p. 759

cc. Rays white (pink or bluish in *dumosus*), heads not over 20 mm. broad.

d. Heads solitary at the ends of slender branchlets.

A. dumosus, p. 760

dd. Heads paniculate or racemose.

e. Paniculate, not in one-sided racemes, plants nearly glabrous.

f. Leaves lanceolate, somewhat serrate in the middle; heads 16–20 mm. broad. *A. paniculatus*, p. 760

ff. Leaves linear lanceolate to subulate, entire or mostly so; heads 8–12 mm. broad. *A. ericoides*, p. 760

ee. Heads racemose, one-sided on the branches.

f. Stem leaves oval, oblong or lanceolate serrate or chiefly so; stem pubescent or glabrate.

A. lateriflorus, p. 761

ff. Stem leaves linear lanceolate to linear, nearly entire, stem glabrate.

A. vimineus, p. 761

aaaa. Leaves fleshy, narrow, entire, maritime plants.

b. Heads 12–25 mm. broad.

A. tenuifolius, p. 761

b. Heads 6–10 mm. broad.

A. subulatus, p. 761

Aster divaricatus L. White Wood Aster.

Aster divaricatus Linnæus, Sp. Pl. 873. 1753 [Virginia].

Aster corymbosus Willis 30.—Britton 136.

Common in rich woods of the northern counties and occasional or locally frequent in the Middle district.

Fl.—Late August to early October.

Middle District.—New Egypt, Pemberton (C), Medford (S), Oaklyn (S), Springdale (S), Little Timber Creek (P), Mickleton (C), Swedesboro.

Aster macrophyllus L. Large-leaved Aster.

Aster macrophyllus Linnæus Sp. Pl. Ed. 2. 1232. 1763 [North America].—Willis 30.—Britton 136.—Keller and Brown 328.

Frequent in rich woods of the northern counties, but rare within our limits in the upper Middle and Cape May districts.

Fl.—Early August to late September, probably.

Middle District.—Colt's Neck, Mon. Co. (C), Timber Creek (P).

Cape May.—Rio Grande (OHB).

Aster cordifolius L. Blue Wood Aster.

Aster cordifolius Linnæus, Sp. Pl. 875 [America].—Knieskern 17.—Britton 137.

Common in rich woods of the northern counties, rare within our limits and confined to the upper part of the Middle district.

Fl.—Mid-September to mid-October.

Middle District.—New Egypt.

***Aster undulatus* L. Wavy-leaved Aster.**

Aster undulatus Linnæus, Sp. Pl. 875 [North America], Britton 137.

Dry woods; common throughout the State.

Fl.—Early September to mid-October.

Middle District.—Birmingham, W. Deptford, Swedesboro, Merchantville (P).

Pine Barrens.—Manahawkin, Atco, Cedar Brook, Malaga, Landisville, Egg Harbor City.

Cape May.—Bennett (S).

***Aster patens* Ait. Late Purple Aster.**

Aster patens Aiton, Hort. Kew. III. 201. 1789 [Virginia].—Barton, Fl. Phila. I. 113. 1818.—Knieskern 17.—Britton 137.

Dry soil; apparently common throughout the State.

Fl.—Mid-August to early October.

Middle District.—New Egypt, Medford (S), Orchard (S), Blackwood, Ashland, W. Deptford.

Pine Barrens.—Barnegat, Whitings (S), Atsion (S), Taunton (S), Cedar Brook, Newtonville, Landisville (T), Vineland (S), Hammonton, Batsto, Egg Harbor City (S), Weymouth (T), Mays Landing (S), Seaville (S).

***Aster novæ-angliæ* L. New England Aster.**

Aster novæ-angliæ Linnæus, Sp. Pl. 875 [New England].—Britton 139.—Keller and Brown 329.

Common in the northern district, but rare within our limits, occurring only in the Middle, Coast and Cape May districts, escaping from cultivation in some localities.

Fl.—Early September to mid-October.

Middle District.—New Lisbon (C), Pemberton (C), Mannington (C), Daretown (C), Camden (CP).

Pine Barrens.—Toms River (P), Ancora (CP), (Escapes?).

Cape May.—Rio Grande (OHB).

Coast Strip.—Wildwood (UP).

* *A. phlogifolius* has been reported from Atco by Britton on authority of Parker, but there is no specimen in his herbarium, and I can find no evidence of the occurrence of the species within our limits.

Aster puniceus L. Purple-stemmed Aster.

Aster puniceus Linnæus, Sp. Pl. 875. 1753 [North America].—Britton 139.

Common in swamps of the northern counties and locally frequent in the Middle and Cape May districts, also occasional on the coast.

Fl.—Late August to early October.

Middle District.—New Egypt, Washington Park, Mickleton, Swedesboro.

Coast Strip.—Below Mays Landing.

Cape May.—Cold Spring (S).

Aster lævis L. Smooth Aster.

Aster lævis Linnæus, Sp. Pl. 876. 1753 [N. America].—Britton 139.

Frequent in the northern counties, very rare within our limits and known from but one locality.

Fl.—Early September to early October.

Middle District.—Camden (P).

Aster novi-belgii L. New York Aster.

Aster novi-belgii Linnæus, Sp. Pl. 877 [Virginia and Penna.].—Britton 138.

Aster novi-belgii var. *elodes* Britton 139.—Keller and Brown 330.

Aster novi-belgii var. *litoreus* Britton 138.

Frequent throughout the State; most abundant on the coast, so far as southern New Jersey is concerned.

I fail to distinguish the so-called varieties of this Aster; they seem to be simply individual forms of a variable species, with little or no constancy.

Fl.—Early September to late October.

Middle District.—Keyport (NB), Farmingdale (S), New Egypt, Crosswicks, Swedesboro.

Pine Barrens.—Toms River (S), Island Heights Inc., Chatsworth, Kenilworth (S), Clementon, Cedar Brook, Malaga (P), Atsion (P), Absecon, Hammonton (S), Pleasant Mills, Egg Harbor City, Sea Isle Inc. (S), Ocean City Inc. (S).

Coast Strip.—Seaside Park (S), Barnegat, West Creek (S), Barnegat City (L), N. Beach Haven (L), Surf City (L), Beach Haven Crest (L), Atlantic City (P), Palermo (S), Piermont (S), Wildwood.

Cape May.—Cold Spring (OHB), Cape May (OHB).

Aster concolor L. Silvery Aster.

Aster concolor Linnæus, Sp. Pl. Ed. 2. 1228. 1763 [Virginia].—Pursh, Fl. Am. Sept. II. 548. 1814.—Barton Fl. Phila. II. 110. 1818.—Knieskern 17.—Willis 30.—Britton 137.—Keller and Brown 330.

758 REPORT OF NEW JERSEY STATE MUSEUM.

Frequent in dry sandy ground in the Pine Barrens and locally in the Middle and Cape May districts.

Fl.—Late August to early October.

Middle District.—Burlington, Southburg (C), Medford, Ashland, Lindenwold, Mickleton (C), Jericho (C), W. Deptford.

Pine Barrens.—Prosperstown, Manchester (NB), Whitings (S), Staffordville, Speedwell (S), Jones Mill (S), Atsion, Clementon, Albion, Cedar Brook, Atco, Berlin, Malaga (S), Taunton (S), Landisville, Quaker Bridge (S), Hammonton, Batsto (P), Mays Landing, Elwood (P).

Cape May.—Cape May (S).

Aster spectabilis Ait. Showy Aster.

Aster spectabilis Aiton, Hort. Kew. III. 209. 1789 [North America].—Nuttall, Gen. II. 157. 1818.—Barton, Fl. Phila. II. 117. 1818.—Knieskern 17.—Willis 30.—Britton 137.—Keller and Brown 330.

Aster surculosus Britton 137.—Keller and Brown 330.—Robinson and Fernald, Rhodora 1909. 58.

Common in dry sandy ground in the Pine Barrens and Cape May peninsula, and locally in the Middle district, occurring at only three stations north of our limits in Morris, Mercer and Middlesex Counties.

The most showy Aster of our region, with flower heads often 35 mm. in diameter.

Robinson and Fernald have disposed of the original New Jersey record of *Aster surculosus* by showing that it was based upon a specimen of *A. spectabilis*, and all specimens of alleged *surculosus* that I have examined prove to be the same thing.

Fl.—Late July to late September.

Middle District.—Medford, Ashland, Haddonfield, Westmont (S), Woodbury (P), Mickleton.

Pine Barrens.—Asbury Park (NB), Deal, Brindletown, Brown's Mills (P), Forked River, Pasadena, Manchester (NB), Bamber, Whitings, Speedwell, Chatsworth, Taunton (S), Jackson, Clementon, Bear Swamp (S), Albion, Pen Bryn (S), Atco, Winslow (S), Landisville, Newfield, Hammonton, Quaker Bridge (P), Pleasant Mills, Folsom, Egg Harbor City, Dennisville.

Cape May.—Cold Spring (OHB).

Aster gracilis Nutt. Slender Aster.

Aster gracilis Nuttall, Gen. II. 158. 1818 [Kentucky and Tennessee].—Britton 137.—Keller and Brown 330.

Common in dry sandy woods of the Pine Barrens and Cape May peninsula, and occasional in the southern part of the Middle district and the Coast Strip.

Fl.—Late July to early September.

Middle District.—Dividing Creek, Bridgeton.

Pine Barrens.—Forked River (NB), Manahawkin, Bamber, Chatsworth, Winslow Inc., Waterford, Landisville, Hammonton, Pancoast (NB), Quaker Bridge, Pleasant Mills (P), Egg Harbor City, Tuckahoe (S), Dennisville (S).

Coast Strip.—Ocean City (S).

Cape May.—Court House, Bennett.

Aster radula Ait. Low Rough Aster.

Aster Radula Aiton, Hort. Kew. III. 210. 1789 [Nova Scotia].—Willis 30.—Britton 136.—Keller and Brown 330.

Bogs of the Middle district, rare; also one record for the edge of the Pine Barrens and one for Morris County.

Fl.—Early August to early September.

Middle District.—Southburg (C), Bricksburg (NB), Merchantville (P), Griffith's Swamp, Mickleton (BH), Swedesboro (CDL).*

Aster nemoralis Ait. Bog Aster.

Aster nemoralis Aiton, Hort. Kew. III. 198. 1789 [Nova Scotia].—Knieskern 17.—Willis 31.—Britton 139.—Keller and Brown 330.

Frequent in Cedar Swamps of the Pine Barrens reaching here the southern limit of its distribution.

This is distinctly the Aster of the Cedar Swamps and cold bogs, where most of the other stragglers from the north find congenial surroundings. It does not range farther south than the Pine Barrens of New Jersey, and Absecon seems to be our southernmost record, although it no doubt extends farther, certainly to Mays Landing.†

Fl.—Mid-August to late September.

* Mr. U. C. Smith's record in Keller and Brown's list for Egg Harbor City cannot be verified, and is, without much doubt, due to a misidentification, inasmuch as a number of his specimens of this genus are wrongly named.

† The record for Swedesboro (KB) should have been Atco according to Mr. Lippincott's herbarium.

Nuttall (Gen II. 155) records *Aster paludosus* "from Cape May County, New Jersey, to Florida on the margins of open swamps," but there is nothing to substantiate the record.

Pine Barrens.—Toms River (S), Forked River, Waretown, Pasadena, West Creek (S), Tuckerton, Bamber, Jones' Mill (S), Speedwell, Chatsworth, Atsion (P), Parkdale (S), Kenilworth (S), Brown's Mills (KB), Cedar Brook, Hammonton, New Germany, Eighth St., Pleasant Mills, Egg Harbor City, Absecon (S).

Aster dumosus L. Bushy Aster.

Aster dumosus Linnæus, Sp. Pl. 873. 1753 [North America].—Britton 138.

Sandy woods, etc.; frequent in the Pine Barren, Coast and Cape May districts and locally in the Middle district, also in Sussex County.

Much of our material, especially from the Pines, is referable to the form *coridifolius*, but all sorts of variations occur.

Fl.—Late August to early October.

Middle District.—Medford (S), Ashland, W. Deptford, Swedesboro.

Pine Barrens.—Forked River, Island Heights Inc., West Creek (S), Whitings (S), Cedar Grove (S), Speedwell (S), Taunton (S), Clementon (S), Atco, Waterford, Cedar Brook, Pen Bryn (S), Landisville, Batsto, Belleplain (S).

Coast Strip.—Seaside Park, Surf City (L), Ship Bottom (L), Beach Haven (L).

Cape May.—Dennisville (S), Court House (S), Bennett.

Aster paniculatus Lam. White-panicled Aster.

Aster paniculatus Lamareck. Encycl. I: 306. 1783 [N. America].—Britton 138.
—Keller and Brown 331.

Common throughout the northern counties in low ground, occasional southward in the Middle district.

Fl.—Early September to late October.

Middle District.—Fancy Hill, Washington Park, Mickleton (KB), Swedesboro.

Pine Barrens.—Landisville, Mays Landing (C) probably introduced.

Aster ericoides L. Heath Aster.

Aster ericoides Linnæus, Sp. Pl. 875. 1753 [North America].—Britton 138.

In dry open ground; common throughout the northern counties, less common southward, but does not occur in the Pine Barrens, except as a weed in cleared or cultivated ground.

Fl.—Late August to mid-October.

Middle District.—New Egypt, Swedesboro.

Pine Barrens.—Landisville (as a weed).

Coast Strip.—Manahawkin, Absecon.

Cape May.—Cold Spring (S), Cape May (OHB).

Aster lateriflorus (L.). Starved Aster.

Solidago lateriflorus Linnæus, Sp. Pl. 879. 1753 [North America].

Aster lateriflorus Britton 138.

Aster lateriflorus thyrsoides Keller and Brown 331.

Common in various situations in the northern counties and on the coast, locally elsewhere, except in the Pine Barrens, where it does not occur.

Mr. Long thinks our coastal material is probably referable to var. *thyrsoides*. It is low, with a dense inflorescence, but very variable.

Fl.—Early September to mid-October.

Middle District.—Birmingham.

Coast Strip.—Waretown, Barnegat City (L), Surf City (L), Ship Bottom (L), Sea Isle City, Wildwood.

Cape May.—Cold Spring (S), Cape May (OHB).

Aster vimineus Lam. Small White Aster.

Aster vimineus Lamareck, Encycl. I. 306. 1783 [Canada].—Keller and Brown 332.

Frequent throughout our region, except in the Pine Barrens, where it is absent; also occasional in the northern counties.

Fl.—Late August to mid-October.

Middle District.—Locust Grove (S), Lindenwold, Camden, W. Deptford, Riddleton.

Pine Barrens.—Landisville (as a weed).

Coast Strip.—Como, Barnegat City (L), Wildwood.

Cape May.—Cold Spring (S), Town Bank (OHB).

Aster tenuifolius L. Large-flowered Salt Marsh Aster.

Aster tenuifolius Linnæus, Sp. Pl. 873. 1753 [North America].—Britton 139.
—Keller and Brown 332.

Aster flexuosus Nuttall, Gen. II. 154 [Salt Marshes of N. J. and N. Y.].—Knieskern 18.—Willis 31.

Salt marshes of the coast and lower Delaware Bay frequent.

Fl.—Early September to early October.

Maritime.—Pt. Pleasant (S), Seaside Park (S), Barnegat Pier, Forked River, Ship Bottom (L), Beach Haven (L), Absecon, Atlantic City, Ocean City, Palermo (S), Avalon, Wildwood, Anglesea, Cape May.

Aster subulatus Michx. Small-flowered Salt Marsh Aster.

Aster subulatus Michaux, Fl. Bor. Am. II. 111 [Maritime Swamps, Penna. and Carolina].—Nuttall, Gen. II. 155. 1818.—Britton 139.—Keller and Brown 332.

Common in salt marshes of the coast and lower Delaware Bay.

This and the preceding are typical salt marsh species and occur in about equal numbers all along the coast.*

Fl.—Early September to early October.

Maritime.—Long Branch, Sea Girt, Seaside Park, Island Heights Jnc., Spray Beach (L), Barnegat City Jnc. (L), Ocean City, Palermo (S), Absecon, Atlantic City, Wildwood, Holly Beach, Cold Spring (S), Cape May, So. Dennis (S).

ERIGERON L.

Erigeron pulchellus Michx. Robin's Plantain.

Erigeron pulchellum Michaux, Fl. Bor. Am. II. 124. 1803 [Canada, Pennsylvania and Mts. of Carolina].

Erigeron bellidifolius Britton 140.

Frequent in open woods and fields in the Northern and Middle districts, rare in the Cape May peninsula.

Fl.—Early May to early June.

Middle District.—New Egypt, Birmingham, Medford (S), Sewell (S), Camden (C), Gloucester, Mickleton, Swedesboro, Downstown (T).

Cape May.—Cold Spring (OHB).

Erigeron annuus (L.). Daisy Fleabane.

Aster annuus Linnæus, Sp. Pl. 875. 1753 [Canada].

Erigeron annuus Britton 140.

Fields and roadsides throughout the State; so completely a weed that its original distribution cannot now be ascertained. Certainly not native of the Pine Barrens, however.

Fl.—Early June into July, sporadically much later.

Middle District.—Pemberton (NB), Buckshutem.

Coast Strip.—Tucker's (L).

Erigeron ramosus (Walt.). Slender Daisy Fleabane.

Doronicum ramosum Walter, Fl. Car. 205. 1788 [Carolina].

Erigeron ramosus Britton 140.

Common in fields and roadsides throughout the State. Certainly not native of the Pine Barrens, but now so much of a weed

* *Aster longifolius*, *A. concinnus* and *A. tradescanti* have been recorded in the New Jersey lists as occurring within our range, but no herbarium specimens are extant, and our field researches have failed to detect them. These facts, together with the general difficulty in correctly naming species of this genus, are, I think, sufficient excuse for ignoring them for the present.

that its original distribution elsewhere cannot be determined.

Fl.—Early June into July.

Middle District.—New Egypt, Westville, Swedesboro, Husted (S).

Pine Barrens.—Landisville, Hammonton.

Coast Strip.—Surf City (L), Barnegat City (L), Spray Beach (L).

LEPTILON Rafinesque.

Leptilon canadense (L.). Horse Weed.

Erigeron canadense Linnæus, Sp. Pl. 863. 1753 [Canada, Virginia].—Knieskern 18.—Britton 140.

Common in waste and cultivated ground throughout the State; everywhere a weed. Original distribution not now ascertainable, but certainly not native in the Pine Barrens.

Fl.—Late July into October.

Middle District.—New Egypt, Kaighns Pt., Swedesboro.

Coast Strip.—Spray Beach (L), Atlantic City (S), Ocean City (S), Avalon.

Cape May.—Cold Spring (S).

DÖELLINGERIA Nees.

Dœllingeria umbellata (Mill.). Tall Flat-top Aster.

Aster umbellata Miller, Gard. Dist. Ed. 8. No. 22. 1768 [no locality].—Barton, Fl. Phila. II. 111. 1818.—Britton 140.

? *Diplopappus amygdalinus* Knieskern 18.

Dœllingeria umbellata Keller and Brown 333.

Frequent in the Northern and Middle districts and along the Coast Strip in moist ground.

Fl.—Mid-August to mid-September.

Middle District.—New Egypt, Pemberton (C), Lindenwold, Camden, Atco, Sumner (S), Mickleton, Swedesboro.

Coast Strip.—Belmar, Forked River, Manumuskin, Sea Isle Inc. (S).

Cape May.—Bennett (S), Cold Spring (S).

Dœllingeria umbellata humilis (Willd.). Pine Barren Flat-top Aster.

Aster humilis Willdenow, Sp. Pl. III. 2038. 1804 [Pennsylvania].

Dœllingeria humilis Keller and Brown 333.

Aster umbellatus var. *humilis* Britton 140.

Open swamps in the Pine Barrens; not common.

Fl.—Mid-August to mid-September, probably.

Pine Barrens.—Ocean and Monmouth Counties (Kn), Egg Harbor City, Mays Landing (NB).

Dœllingeria infirma (Michx.). Cornel-leaved Aster.

Aster infirmus Michaux, Fl. Bor. Am. II. 109. 1803 [Canada to Carolina in the mountains].

Diplopappus cornifolius Knieskern 18.

Aster cornifolius Britton 140.

Dœllingeria infirma Keller and Brown 333.

Frequent in the northern counties, rare within our limits, occurring only in the Middle district.

Fl.—Late July to late August.

Middle District.—Ocean and Monmouth Counties (Kn), Mickleton (C), Swedesboro.

IONACTIS Greene.

Ionactis linariifolius (L.). Stiff-leaved Aster.

Pl. CXXV.

Aster linariifolius Linnæus, Sp. Pl. 874. 1753 [North America].—Barton, Fl. Phila. II. 110. 1818.—Britton 139.

Diplopappus linariifolius Knieskern 18.

Dry, sandy ground; frequent or occasional throughout the State.

Fl.—Early September to mid-October.

Middle District.—Farmingdale, New Egypt, Medford (S), Clementon, W. Deptford.

Pine Barrens.—Manahawkin, Barnegat, Whittings (S), Jones' Mill (S), Atsion (S), Taunton (S), Malaga (S), Albion, Cedar Brook, Atco, Landisville, Vineland (S), Pleasant Mills, Egg Harbor City.

Cape May.—Cold Spring (OHB).

BACCHARIS L.

Baccharis halimifolia L. Groundsel Bush.

Pl. CXXI., Fig. 1.

Baccharis halimifolia Linnæus, Sp. Pl. 860. 1753 [Virginia].—Knieskern 18.—Willis 32.—Britton 141.—Keller and Brown 333.

Common along the edges of the salt marshes on the coast and up the larger streams. Rarely in the interior.

A conspicuous shrub along the thoroughfares and borders of the salt marshes, especially in September, when the seeds are ripe and the bright tufts of silvery white pappus stand out in strong relief against the dark foliage.

Fl.—Late August to late September. *Fr.*—Late September to late October.

Middle District.—Burlington, Westville.

Pine Barrens.—Landisville.

Coast Strip.—Sandy Hook, Long Branch, Spring Lake (NB), Seaside Park, Forked River, Waretown, Ship Bottom (L), Cedar Bonnet (L), Absecon, Atlantic City, Ocean City (S), Avalon, Wildwood, Cape May, Dennisville (S), Salem.

PLUCHEA Cassini.

Flowering and Fruiting Data.—In all the *Inuleæ*—*Pluchea*, *Antennaria*, *Anaphalis* and *Gnaphalium*—the season noted includes from the beginning of the flowering period to the time of full maturity, when the heads break up.

Pluchea foetida (L.). Viscid Marsh Fleabane.

Baccharis foetida Linnæus, Sp. Pl. 861. 1753 [Virginia].

Pluchea foetida Britton 141.—Keller and Brown 334.

Rare and confined to the lower part of the Cape May peninsula.

This southern species was first discovered in the State by Mr. Isaac C. Martindale in the vicinity of Cape May, August 23d, 1877, and subsequently by Mr. C. F. Parker, July 24th, 1880. It was not collected again until August 11, 1909, when Mr. Stewardson Brown, in company with several other members of the Philadelphia Botanical Club, found a considerable patch of it in a meadow along Dias Creek a mile or more from the bay shore.

Fl. and Fr.—Full bloom August 11, 1909.

Cape May.—Dias Creek, Cape May (NB, CP and P).

Pluchea camphorata (L.). Salt Marsh Fleabane.

Erigeron camphorata Linnæus Sp. Pl. Ed. 2. 1212. 1763 [Virginia].

Pluchea camphorata Knieskern 18.—Willis 32.—Britton 141.—Keller and Brown 334.

Salt marshes along the coast and lower Delaware Bay; common.

One of the most generally distributed of our maritime plants.

Fl. and Fr.—Late August to late October.

Maritime.—Sandy Hook, Long Branch, Pt. Pleasant, Island Heights Inc., Barnegat Pier, Seaside Park, Forked River, Spray Beach (L), Atlantic City, Ocean City, Avalon, Piermont, Wildwood, Cold Spring (S), Cape May, Dias Creek (S), Dennisville (S).

ANTENNARIA Gaertner.**Antennaria neodioica** Greene. **Smaller Mouse-ear Everlasting**

Antennaria neodioica Greene, Pittonia III. 184. 1897 [Stroudsburg and Bushkill, Pa.].

Frequent in the northern counties, less common and local farther south in the Middle and Coast districts.

Fl. and Fr.—Late April to late May.

Middle District.—Delanco, Wenonah, Sewell (S), Quinton, Riddleton, Tomlin, Hainesport, Millville.

Coast Strip.—Manahawkin, Cape May.

Antennaria neglecta Greene. **Field Mouse-ear.**

Antennaria neglecta Greene, Pittonia III. 173. 1897 [Washington, D. C.].

Frequent in dry ground in the Northern, Middle and Coast districts.

Fl. and Fr.—Mid-April to mid-May.

Middle District.—New Egypt, Delanco, Kinkora, Medford, Quinton, Riddleton.

Pine Barrens.—Williamstown Jnc. (S).

Coast Strip.—Surf City (L), Manahawkin, Palermo, Cape May.

Antennaria plantaginifolia (L.). **Plantain-leaved Mouse-ear.**

Pl. CXXI., Fig. 2.

Gnaphalium plantaginifolia Linnæus, Sp. Pl. 850. 1753 [Virginia].

Antennaria plantaginifolia Knieskern 19.—Britton 141.

Frequent in dry ground in the Northern, Middle and Cape May districts.

Fl. and Fr.—Late April to late May.

Middle District.—Bordentown, Beverly, Medford (S), Mantua, Sewell (S), Swedesboro, Riddleton, Quinton, Bridgeton.

Pine Barrens.—Landisville, Palermo.

Cape May.—Court House.

Antennaria fallax Greene. **Tall Mouse-ear.**

Antennaria fallax Greene, Pittonia III. 321. 1898 [Washington, D. C.].

Occasional in the Middle district in dry, open ground, probably also in the northern counties.

Fl. and Fr.—Late April to late May.

Middle District.—Bordentown, Hainesport, Woodbury, Millville, Medford, Mantua, Glassboro (S), Mickleton, Swedesboro, Quinton.

***Antennaria parlinii* Fernald. Parlin's Mouse-ear.**

Antennaria Parlinii Fernald, Garden and Forrest X. 284. July, 1897 [N. Berwick, Me.].

Frequent or occasional in open woods in the Middle, Coast and Cape May districts.

Fl. and Fr.—Late April to late May.

Middle District.—Medford (S), Millville, Sewell (S), Riddleton, Woodbury Hts.

Pine Barrens.—Williamstown Jnc. (S), Albion.

Coast Strip.—Waretown, Barnegat, Staffordville.

Cape May.—Court House (S), Bennett, Cape May.

ANAPHALIS DC.***Anaphalis margaritacea* (L.). Pearly Everlasting.**

Gnaphalium margaritaceum Linnaeus, Sp. Pl. 850. 1753 [North America].

Antennaria margaritacea Knieskern 19.

Anaphalis margaritacea Britton 141.

Dry ground and clearings of the northern counties, occasional southward in all the districts.

Fl. and Fr.—Mid-July to late August.

Middle District.—Keyport (C), New Egypt, Camden, Jackson, Mickleton, Swedesboro, Sandy Hook (C).

Coast Strip.—Sandy Hook (C), Long Branch, N. Spring Lake (C), Manahawkin, Spray Beach (L), Barnegat City (L), Ship Bottom (L), Beach Haven Terrace (L).

Pine Barrens.—Chatsworth (C), Penbryn (S), Atco (C), Landisville.

GNAPHALIUM L.***Gnaphalium obtusifolium* L. White Everlasting.**

Gnaphalium obtusifolium Linnaeus, Sp. Pl. 851. 1753 [Virginia and Pennsylvania].—Britton 142.

Gnaphalium polycephalum Knieskern 19.

Common in dry open ground throughout the State, especially plentiful along the coast.

Fl. and Fr.—Late August to late September.

Middle District.—Medford (S), Albion, Washington Park, Mickleton.

Pine Barrens.—Speedwell (S), Tuckahoe (S).

Coast Strip.—Sandy Hook (T), Ship Bottom (L), Surf City (L), Spray Beach (L), Atlantic City (S), Avalon.

Cape May.—Dennisville (S), Cold Spring (S), Bennett (S).

Gnaphalium uliginosum L. Low Cud-weed.

Gnaphalium uliginosum Linnæus, Sp. Pl. 856. 1753 [Europe].—Knieskern 19.—Britton 142.

Northern and Middle districts; probably always a weed in our region, where it is only occasionally found.

Fl. and Fr.—Apparently late June into October.

Middle District.—Mickleton.

Gnaphalium purpureum L. Purplish Cud-weed.

Gnaphalium purpureum Linnæus, Sp. Pl. 854. 1753 [Carolina, Virginia and Pennsylvania].—Barton, Fl. Phila. II. 105. 1818.—Knieskern 19.—Britton 142

Frequent in dry open sandy ground throughout our region, and ranging north occasionally to Union, Bergen and Morris Counties.

Especially common in open sandy tracts about deserted houses, abandoned fields, etc., where it takes on somewhat the character of a weed.

Fl. and Fr.—Late May to early July, and sporadically through summer or even into autumn.

Middle District.—New Egypt (NB), Mantua, Mickleton, Swedesboro, Riddleton.

Pine Barrens.—Cedar Brook, Winslow Jnc., Quaker Bridge (NB), Landisville, Mays Landing (NB), Tuckahoe.

Coast Strip.—Surf City (L), Spray Beach (L), Beach Haven (L), Stone Harbor, Anglesea.

Cape May.—Cape May, Cape May Pt. (S).

HELIOPSIS Persoon.

Heliopsis helianthoides (L.). Ox-eye.

Buphthalmum Helianthoides Linnæus, Sp. Pl. 904. 1753 [North America].

Heliopsis laevis Barton, Fl. Phila. II. 127. 1818.—Knieskern 18.

Heliopsis helianthoides Britton 143.—Keller and Brown 336.

Frequent along streams and edges of woods in the northern counties; rare within our limits in the Middle district.

Fl.—Early July to early September.

Middle District.—Ocean and Monmouth Cos. (Kn), Crosswicks (C), Camden, Westville.

RUDBECKIA L.

Rudbeckia laciniata L. Tall Cone-flower.

Rudbeckia laciniata Linnæus, Sp. Pl. 906. 1753 [Virginia and Canada].—Knieskern 18.—Britton 144.

Low damp thickets or along streams; frequent in the northern counties and less common southward in the Middle district, especially along the Delaware.

Fl.—Late July to late September.

Middle District.—Monmouth and Ocean Cos. (Kn), New Egypt, Delair, Crosswicks (C), Kaighns Pt., Mickleton, Swedesboro.

HELIANTHUS L.

Key to the Species.

- a. Disc purple or brownish.
 - b. Leaves linear. *H. angustifolius*, p. 769
 - bb. Leaves broad, ovate. [H. annuus]*
- aa. Dish yellow or yellowish.
 - b. Leaves prevailingly lanceolate, scabrous at least above.
 - c. Stem scabrous at least above, leaves sessile or nearly so, hirsute beneath. *H. giganteus*, p. 770
 - cc. Stem glabrous, leaves sessile by a truncate base. *H. divaricatus*, p. 770
 - bb. Leaves prevailingly ovate or oblong.
 - c. Sessile, stem glabrous. *H. divaricatus*, p. 770
 - cc. Petioled.
 - d. Stem puberulent or glabrous.
 - e. Leaves membranaceous, regularly serrate. *H. decapetalus*, p. 770
 - ee. Leaves firmer, less serrate or entire. *H. strumosus*, p. 771
 - dd. Stem hispid. [H. tuberosus]†

Helianthus angustifolius Linnæus. Narrow-leaved Sunflower.

Helianthus angustifolius Linnæus, Sp. Pl. 906. 1753 [Virginia].—Pursh, Fl. Am. Sept. II. 572. 1814.—Knieskern 18.—Willis 33.—Britton 145.—Keller and Brown 337.

Frequent in swamps of the Pine Barrens and Cape May peninsula, also rarely in "Pine Barren islands" in the Middle district and on the coast. Recorded but once north of our limits, near Trenton.

* Common Sunflower, escaped from gardens.

† Jerusalem Artichoke, escaped from cultivation.

This is the most widely distributed Sunflower of the Pines, but always a bog plant, often growing in shallow water. The only other Pine Barren species, *H. divaricatus*, is a dry ground plant.

Fl.—Early August to late September.

Middle District.—Griffith's Swamp, Mickleton (C), Swedesboro.

Pine Barrens.—Como, Seabright (C), Asbury Park (KB), Pt. Pleasant (KB), Toms River, Island Hts. Inc., Forked River, Seaside Park, Barnegat, Manahawkin, West Creek (S), Speedwell (S), Parkdale (S), Atsion, Landisville (T), Winslow, Quaker Bridge, Pleasant Mills, Hammonton, Egg Harbor City, Petersburg, Palermo, Mays Landing (S), Millville (KB).

Coast Strip.—Barnegat City (L).

Cape May.—Court House (S), Bennett, Cape May Pt. (S).

***Helianthus giganteus* L. Tall Sunflower.**

Helianthus giganteus Linnæus, Sp. Pl. 905. 1753 [Virginia and Canada].—Britton 145.

H. giganteus var. *ambiguus* Britton 145.

Frequent in open swampy ground of the Northern and Middle districts and especially along the coast southward to Cape May.

Fl.—Early August to late September.

Middle District.—Lindenwold, Mickleton (NB), Swedesboro.

Coast Strip.—Surf City (L), Cedar Bonnet (L), Atlantic City (S), Ocean City (S).

***Helianthus divaricatus* L. Rough Wood Sunflower.**

Helianthus divaricatus Linnæus, Sp. Pl. 906. 1753 [North America].—Knieskern 18.—Britton 145.

Frequent in dry woods or clearings in the Northern and Middle districts, occasionally or locally common in the Pine Barrens and Cape May peninsula.

Fl.—Mid-July to early September.

Middle District.—New Egypt, Camden, Lindenwold, Swedesboro.

Pine Barrens.—Pen Bryn (S), Iona (S), Berlin (S), Landisville (T), Hammonton (T), Weymouth (T).

Cape May.—Cape May.

***Helianthus decapetalus* Linn. Thin-leaved Sunflower.**

Helianthus decapetalus Linnæus, Sp. Pl. 905. 1753 [Canada].—Barton, Fl. Phila. II. 129. 1818.—Britton 145.

Edges of rich woodland; frequent in the northern counties and occasional within our limits in the upper Middle district.

Fl.—Late July to early September.

Middle District.—New Egypt, Riverton (C), Mullica Hill (C), South of Woodstown.

***Helianthus strumosus* Linn. Pale-leaved Sunflower.**

Helianthus strumosus Linnæus, Sp. Pl. 905. 1753 [Canada].—Britton 145.

Dry woods; frequent in the northern counties and occasional southward in the Middle district.

Fl.—Mid-August to late September.

Middle District.—Keyport (C), New Egypt, Locust Grove (S), Camden (P), Blackwood, Mickleton (C), Atco (C).

VERBESINA L.

***Verbesina alternifolia* (L.). Actinomeris.**

Coreopsis alternifolia Linnæus, Sp. Pl. 909. 1753 [Virginia and Canada].

Actinomeris alternifolia Britton 145.

Verbesina alternifolia Keller and Brown 338.

In part introduced, but probably rarely native along the Delaware River, where it occurs locally and where it reaches the northern limit of its range in the east. No specimen seen.

Fl.—Early August to late September, probably.

Middle District.—Below Burlington (C), Kaighns Pt. (KB).

COREOPSIS L.

***Coreopsis rosea* Nutt. Rose-colored Tickseed.**

Coreopsis rosea Nuttall, Gen. II. 179. 1818 [New Jersey to Georgia].—Britton 146.—Keller and Brown 338.

Sandy swamps of the Pine Barrens; local, also in a few similar situations in the Middle district.

Fl.—Early July to early September.

Middle District.—Freehold (C), Burlington, Florence, Delanco, Clayton (NB).

Pine Barrens.—Forked River, Brown's Mills, Franklinville (P), Willow Grove (S), Vineland (C), Main Road Sta., Atco., Hammonton (KB), Egg Harbor City.

BIDENS L.

Key to the Species.

- a. Leaves lanceolate, serrate, undivided.
 - b. Rays large and conspicuous, twice as long as the disc or longer. *B. lævis*, p. 772
 - bb. Rays not more than twice as long as the disc; very short or wanting.
 - c. Heads nodding after flowering. *B. cernua*, p. 772
 - cc. Heads always erect.
 - d. Pappus awns downwardly barbed. *B. connata*, p. 773
 - dd. Pappus awns upwardly barbed. *B. bidentoides*, p. 773
- aa. Leaves, some or all of them, pinnately 1-3 parted.
 - b. Rays rudimentary or wanting.
 - c. Achenes flat.
 - d. Outer involucre bracts 4-8 mm.; achenes nearly black. *B. frondosa*, p. 773
 - dd. Outer bracts 10-16 mm.; achenes brown. *B. vulgata*, p. 773
 - cc. Achenes linear. *B. bipinnata*, p. 774
 - bb. Rays large and conspicuous.
 - c. Segments of the leaves lanceolate. *B. trichosperma*, p. 774
 - cc. Segments of the leaves linear lanceolate. *B. trichosperma tenuiloba*, p. 774

Bidens lævis (L.). Large Bur-Marigold.

Helianthus lævis Linnæus, Sp. Pl. 906. 1753 [Virginia].

Bidens lævis Britton 147.

Bidens chrysanthemoides Knieskern 19.

Swamps, especially bordering rivers and large streams. Middle and Cape May districts, frequent, also in the northern counties and occasional on the coast.

A particularly characteristic plant of the Delaware river shores and tidal marshes, its large flowers closely resembling those of *Helianthus* or *Rudbeckia*.

Fl. and Fr.—Mid-August into October.

Middle District.—Delair, Fish House, Washington Park, W. Deptford, Center Square, Cooper's Creek, Swedesboro.

Coast Strip.—Tuckahoe (S), Five-Mile Beach.

Cape May.—Cape May.

Bidens cernua L. Nodding Bur-Marigold.

Bidens cernua Linnæus, Sp. Pl. 832. 1753 [Europe].—Britton 147.

Wet, open swamps; frequent in the northern counties and apparently rare southward in the Middle district.

Fl. and Fr.—Mid-August into October.

Middle District.—New Egypt, Pemberton (C), Swimming River (C), Medford (S).

***Bidens connata* Muhl. Purple-stemmed Beggar-ticks.**

Bidens connata "Muhlenberg" Willdenow, Sp. Pl. III. 1718. 1804 [North America].—Knieskern 19.—Britton 147.

Common in swamps throughout the State, except in the Pine Barrens and Cape May peninsula, though it will probably be found in the latter district.

Fl. and Fr.—Early September into October.

Middle District.—Delanco (S), Washington Park (S), Swedesboro.

Coastal Strip.—Sea Girt, Seaside Park (S), Surf City (L), Barnegat City (L), Spray Beach (L), Atlantic City (S), Palermo.

Pine Barrens.—Landisville, Egg Harbor City (introduced ?).

***Bidens bidentoides* (Nutt.). Swamp Beggar-ticks.**

Diodonta bidentoides Nuttall, Tr. Amer. Phil. Soc. (II.) 7:361. 1841 [Vicinity of Philadelphia].

Coreopsis bidentoides Britton 146.

Bidens bidentoides Keller and Brown 339.

Muddy shores of the Delaware River and Bay from Bordentown southward and up the tidewater streams of southwestern New Jersey, also occurs up the Susquehanna to Havre de Grace.

Fl. and Fr.—Early September into October.

Middle District.—Bordentown, Delair, Fish House, Camden, Westville, Washington Park, Bridgeport (C), Salem Co. on the Delaware (C), Millville.

***Bidens frondosa* L. Black Beggar-ticks.**

Bidens frondosa Linnæus, Sp. Pl. 832. 1753 [North America].—Knieskern 18.—Britton 146.

Damp situations; frequent in the northern counties and southward in the Middle and Coast districts.

Fl. and Fr.—Early September into October.

Middle District.—New Egypt, Fish House (S), Delanco (S), Lawnside (S).

Coast Strip.—Spray Beach (L), Atlantic City (S), Five-Mile Beach.

***Bidens vulgata* Greene. Tall Beggar-ticks.**

Bidens vulgata Greene, Pittonia IV, 72. 1899 [E. and Middle States].

Probably common in the northern counties, but only one record within our limits, though it no doubt occurs elsewhere.

Fl. and Fr.—Early September into October.

Pine Barrens?—Landisville (introduced).

Bidens bipinnata L. Spanish Needles.

Bidens bipinnata Linnæus, Sp. Pl. 832. 1753 [Virginia].—Britton 147.

In damp soil and as a weed in cultivated and waste ground; frequent in the Northern and Middle districts, and occasional on the coast.

Fl. and Fr.—Mid-August into October.

Middle District.—New Egypt, Florence Heights, Fancy Hill, Washington Park.

Coast Strip.—Barnegat City (L), Atlantic City (S).

Pine Barrens.—Pleasant Mills (introduced).

Bidens trichosperma (Michx.). Tick-seed Sunflower.

Coreopsis trichosperma Michaux, Fl. Bor. Am. II. 139. 1803 [Upper Carolina].—Pursh, Fl. Am. Sept. II. 568. 1814.—Britton 146.

Bidens trichosperma Keller and Brown 339.

Swamps; common in the Middle Coast and Cape May districts and at a few stations in Sussex, Morris, Bergen, Hudson and Mercer counties north of our limits.

Fl. and Fr.—Late August into October.

Middle District.—New Egypt, Hartford, Burlington, Delanco (S), Hadonfield, Springdale (S), Lawnside (S), Washington Park, W. Deptford, Camden, Swedesboro, Salem (S).

Coast Strip.—Forked River, Seaside Park, Manahawkin, Beach Haven (L) Mouth of Batsto, Mays Landing (S), Palermo.

Cape May.—Dennisville (S), Cold Spring (S).

Bidens trichosperma tenuiloba (Gray). Slender-leaved Tick-seed Sunflower.

Coreopsis trichosperma var. *tenuiloba* Gray, Syn. Fl. I. pt. 2. 295. 1884 [Peat Bogs of Indiana and Illinois].

Bidens trichosperma tenuiloba.—Keller and Brown 340.

Swamps of the Pine Barrens and Coast Strip frequent.

Fl. and Fr.—Late August into October.

Pine Barrens.—Forked River, Atsion (S), Parkdale (S), Atco, Kenilworth (S), Jackson, Hammonton (S), Landisville, Downtown.

Coast Strip.—Seaside Park, W. Creek (S), Manahawkin, Palermo (S), Piermont (S), Ocean View (S).

Cape May.—So. Seaville, Cold Spring, Cape May.

HELENIUM L.**Helenium autumnale L. Sneezeweed.**

Helenium autumnale Linnæus, Sp. Pl. 886. 1753 [North America].—Britton

Swamps and river banks; frequent in the northern counties and down the coast to Cape May; less common in the Middle district, mainly restricted to the vicinity of the Delaware River.

The distribution of this plant is one of the most striking examples of the extension of the range of certain boreal species down both sides of the State, which are entirely absent from the central portion. On the west it follows the river all the way to Salem, never straying from its immediate vicinity except to follow up some tributary, while on the east it is plentiful along the narrow coastal strip and outlying islands all the way to Cape May and up the rivers to the head of tidewater. On the Delaware we are accustomed to regard such occurrences as the result of seed washed down from higher up, but no such theory will answer for the coastal strip, and it may be that its presence there is due to some earlier geological phenomenon. Certain it is that the cold waters from melting glacial ice must have made favorable conditions for a boreal flora both along the Delaware and the coast, but it is presumptuous, perhaps, to claim any direct relationship between this and present plant distribution.

Fl.—Mid-August to mid-September.

Middle District.—Fish House, Kaighns Pt., Coopers Creek, Washington Park, Center Square, Swedesboro, Pennsgrove, Salem (S).

Coast Strip.—Toms River, Forked River, West Creek (S), Barnegat City (L), Peahala (L), Absecon (S), Atlantic City (S), Crowleytown, Pleasant Mills (T), Bæseley's Pt. (S), Palermo, Seaville (S), Mays Landing, Sea Isle City (S).

Cape May.—Cold Spring (S).

ARTEMISIA L.

Artemisia caudata Michx. Wild Wormwood.

Artemesia caudata Michaux, Fl. Bor. Am. II. 129. 1803 [Missouri River].

—Nuttall, Gen. II. 144. 1818.—Knieskern 19.—Willis 34.—Britton 148.

—Keller and Brown 341.

Reported locally from Middlesex to Cumberland counties in the Middle district but apparently rare, as recent collectors have not found it. It is frequent, however, about Manasquan and Point Pleasant, and is reported from Sandy Hook. The statements of Britton and of Keller and Brown, to the effect that it is frequent in the Pine Barrens seem to be incorrect, as there are no

records to substantiate them. The plant, moreover, does not occur on the sea beaches south of Point Pleasant so far as I can ascertain, though Nuttall recorded it from "Islands of Egg Harbor."

Fl.—Late July to late August.

Middle District.—Keyport (C), Shark River (P), Burlington, Beverly, Pemberton (P), Mt. Holly (C), Berkeley, Two miles from Mickleton, Woodbury, Bridgeton (P).

Coast Strip.—Sandy Hook, Manasquan, Pt. Pleasant (S).

ERECHTITES Rafinesque.

Erechtites hieracifolia (L.). White Fireweed.

Senecio hieracifolia Linnæus, Sp. Pl. 866. 1753 [North America].

Erechtites hieracifolia Knieskern 19.—Britton 149.

In low grounds, and as a weed in clearings: frequent throughout the State, but original distribution not now ascertainable. Apparently not native in the Pine Barrens.

Fl.—Late July into September.

MESADENIA Rafinesque.

Mesadenia reniformis (Muhl.). Great Indian Plantain.

Cacalia reniformis "Mulhenberg" Willdenow, Sp. Pl. III. 1735. 1804 [Pennsylvania].—Britton 150.

Mesadenia reniformis Keller and Brown 342.

Only recorded from the vicinity of Camden on the Delaware.

Fl.—Probably late June to mid-July.

Middle District.—Camden.

Mesadenia atriplicifolia (L.). Pale Indian Plantain.

Cacalia atriplicifolia Linnæus, Sp. Pl. 835 [Virginia and Canada].—Britton 150.

Locally on the edges of woods in the Middle district and northward along the Delaware.

Fl.—Mid-July to late August.

Middle District.—Waterford (NB), New Egypt, Riverton, Palmyra (NB), Haddonfield (P), Locust Grove (S), Kaighns Pt., Blackwood, Swedesboro.

SYNOSMA Rafinesque.

Synosma suaveolans (L.). Sweet-scented Indian Plantain.

Cacalia suaveolans Linnæus, Sp. Pl. 835 [Virginia and Canada].—Willis 34. Britton 150.

Synosma suaveolans Keller and Brown 342.

Reported only from Trenton and Freehold in Britton's Catalogue. No specimens seen from our region.

SENECIO L.

Senecio tomentosus Michx. Woolly Squaw-weed.

Senecio tomentosus Michaux. Fl. Bor. Am. II. 119. 1803 [Flat Rock, Carolina].—Britton 150.—Nuttall and Brown 345.

Low swampy ground near the coast marshes, mainly of Cape May County, north on the Atlantic side to West Creek and on the bay side to Dias Creek.

The discovery of this species in New Jersey seems to date from June 4, 1882, when the late Isaac Burk found it at Cape May Point. Curiously enough, it was obtained on June 30 of the same year by Mr. Albert Commons at Ocean View.

Fl.—Early May to early June.

Coast Strip.—West Creek, Ocean View (NB), Cold Spring, Cape May, Cape May Pt., Green Creek, Bino Creek.

Pine Barrens.—Landisville (T), Egg Harbor City (NE), Friendship (T), all apparently introductions from the west.

Senecio crawfordii Britton. Crawford's Squaw-weed.

Senecio Crawfordii Britton, Torrey's L. 22. [Tuliptown, Pa.].—Nuttall and Brown 345.

Senecio aureus obovatus Britton 150.

Damp meadows or bogs in the Middle district, near to the Delaware River, local and not common. There is a specimen of this plant in the Philadelphia Academy herbarium collected by Read many years ago, labelled "*S. heterophylla*, N. J." It seems likely also that Parker's record of "*S. obovatus*" from "River swamp, Camden Co." refers to this form. I doubt if it has any close affinity with *S. balsamifera* as claimed by some recent writers.*

Fl.—Early May to early June.

Middle District.—Between Orchard and Springdale (S).

Senecio aureus L. Golden Ragwort or Squaw-weed.

Senecio aureus Linnaeus, Sp. Pl. 870. 1753 [Virginia and Canada].—Britton 150.

* Cf. *Rhodora* 1908 p. 69.

Frequent in low, usually open ground, in the Northern and Middle districts and rare in the lower Cape May peninsula.

Fl.—Early May to early June.

Middle District.—New Egypt, Delair, Birmingham (C), Camden (P), Haddonfield (S), Lindenwold (S), Glassboro, Atco (C), Washington Park, Mickleton, Swedesboro.

Pine Barrens?—Cedar Lake (C).

Cape May.—Cold Spring (OHB).

CARDUUS L.

Key to the Species.

- a. Bracts of the involucre more or less strongly prickly pointed.
 - b. Leaves tomentous beneath.
 - c. All the bracts prickly pointed. [*C. lanceolatus*]¹
 - cc. Outer bracts only, prickly pointed. *C. discolor*, p. 778
 - bb. Leaves green on both sides. *C. pumilus*, p. 778
- aa. Bracts not at all prickly pointed or scarcely so.
 - b. Heads large, few, 30–100 mm. broad.
 - c. Heads closely subtended by the upper very spiny leaves, flowers usually yellow. *C. spinosissimus*, p. 779
 - cc. Heads peduncled, naked, flowers purple, involucre viscid. *C. muticus*, p. 779
 - bb. Heads small, numerous, 25 mm. broad or less. [*C. arvensis*]²

Carduus discolor (Muhl.). Field Thistle.

Cnicus discolor "Muhlenberg" Willdenow, Sp. Pl. III. 1670. 1804 [North America].—Barton, Fl. Phila. II. 95. 1818.—Nuttall Gen. II. 1230. 1818.

Cnicus altissimus Britton 151.

Cirsium altissimum Knieskern 19.

Common in swamps and meadows in the northern counties and rather frequent down the Coast Strip to Cape May, and locally in the Middle district.

Fl.—Mid-August to late September, occasionally into October.

Middle District.—New Egypt, Lawnside (S), Riddleton.

Coast Strip.—West Creek (S), Palermo, Seaville (S), Cold Spring (S).

Carduus pumilus (Nutt.). Pasture Thistle.

Cnicus pumilus Nuttall, Gen. II. 130. 1818 [New Jersey and New York].

Cnicus odoratus Barton, Fl. Phila. II. 95. 1818.—Britton 151.

¹ Common Thistle a familiar weed.

² Canada Thistle a bad weed, occurring in waste ground or locally in fields.

In meadows frequent northward and occasional southward in the Middle district.

Fl.—Late June to late July.

Middle District.—New Egypt (NB), Burlington, Fairton (S).

Pine Barrens.—Landisville (T), (introduced?).

***Carduus spinosissimus* Walt. Yellow Thistle.**

Carduus spinosissimus Walter, Fl. Car. 194. 1788 [Carolina].—Keller and Brown 344.

Cnicus horridulus Barton, Fl. Phila. II. 95. 1818.

Cirsium horridulum Knieskern 19.—Willis 35.

Cnicus spinosissimus Britton 151.

Frequent in open swamps of the Middle district and along the edge of the coast marshes south to Cape May.

Fl.—Mid-May to late June.

Middle District.—Farmingdale, New Egypt, Burlington, Pemberton (C), Moorestown (KB), Grenloch, Lindenwold (S), Sewell (S), Clementon (KB), Mickleton (KB), Swedesboro, Buckshutem (S).

Coast Strip.—Pt. Pleasant, Seaside Park (KB), Forked River, Manahawkin, Tuckerton, Beach Haven (L), Spray Beach (L), Beach Haven Crest (L), Absecon (KB), Atlantic City (KB), Piermont (S), Wildwood, Cold Spring, Cape May (KB).

***Carduus muticus* (Michx.). Glutinous Thistle.**

Cirsium muticum Michaux, Fl. Bor. Am. II. 89. 1803 [Mountains of Carolina].

Cnicus muticus Britton 151.

Carduus muticus Keller and Brown 345.

Frequent in swamps in the northern counties, less common southward in the Middle and Coast districts.

Fl.—Mid-August to late September, occasionally into October.

Middle District.—New Egypt, Springdale (S), Lindenwold, Mullica Hill (C), Mickleton, Woodstown (KB), Swedesboro.

Coast Strip.—Forked River (KB), Cape May Court House, Cold Spring, Cape May (OHB).

BIBLIOGRAPHY.

It is a difficult matter to trace the original discoverer of a given species of plant. We generally credit the man who is the author of the specific name which the plant bears, but there is frequently an earlier writer who described the plant under a vernacular name or a technical name already in use, or made some other nomenclatural blunder which invalidated his name and often cast his discovery into oblivion. Again there is the actual discoverer of the plant, who may have sent it to the author with explanations as to its probable relationships, and back of him, perhaps, is the backwoodsman who has long known the plant by a vernacular name of his own, but who never heard of scientific nomenclature or the importance of publication. For practical purposes we are usually forced to follow custom and consider the author of the name as the discoverer of the plant.

Examining the preceding pages we find that Linnæus* was acquainted with no less than 570 of the species here treated. He never visited America, but acquired his knowledge of our plants from the collections or publications of Dillenius, Gronovius, Plukenet, Catesby, Kalm, Colden, etc., and to living plants grown in European botanic gardens. Being the originator of the binomial system of nomenclature, his specific names are the earliest, and are, therefore, still in use for all the plants known to him, although most of his genera have since been subdivided. Many of the New Jersey plants that bear his names are boreal species, known also from Europe; but the large number of truly American Coastal Plain plants which he named shows how thorough was the work of the early botanists who traveled in this region. Comparatively few of these plants were discovered in New Jersey, most of them being described from Virginia or Carolina.

* Cf. Jour. N. Y. Bot. Garden, June, 1907, for sketch of Linnæus and his relation to American botany, by P. A. Rydberg.

John Bartram, however, transmitted quite a number of specimens to Linnæus, which, although usually credited to Pennsylvania, must have come from across the Delaware in New Jersey.

The first American botanist to name and describe additional species on the plan established by Linnæus was Thomas Walter,* who, in 1788, published a volume on the Plants of Carolina, in which appear forty New Jersey species with which Linnæus was unacquainted. After him came Andre Michaux,† the French botanist, who, after Linnæus, was the author of the largest number of our New Jersey plant names. Michaux traveled widely in America, and in his Flora (1803) are published 117 species of New Jersey plants unknown to Linnæus or Walter. Apparently none of these, however, was discovered within our limits.

Rev. Henry Muhlenberg, of Lancaster, Pennsylvania, probably the most learned American botanist of his time, is authority for 42 of the species mentioned in the preceding pages. These were mainly published in a posthumous work on Grasses and Sedges or in Willdenow's Species Plantarum, from specimens sent him by Muhlenberg. The latter published a Catalogue of North American Plants in 1813, but as descriptions are lacking and as death prevented him from publishing the full descriptive work that he had contemplated, most of the names here proposed rest as mere *nomina nuda*, with no place in scientific nomenclature.

Of the early botanists who did more or less actual collecting in the Coastal Plain of New Jersey, Pursh is responsible for 33 of our species; Nuttall for 29; Rafinesque for 17 and Torrey (sometimes in conjunction with Gray) for 37.

Only 100 of the 1401‡ species listed in the foregoing pages were originally described from southern New Jersey, which emphasizes the fact that most of the early American botanical works were based upon collections made in other States—especially in Virginia and the Carolinas. Furthermore, although many botanists have explored the New Jersey Pine Barrens in subsequent years and many collections have been made, there has

* Cf. Brainerd Bull. Charleston (S. C.) Mus. III. 33, for biography.

† Cf. Bot. Gazette VIII, 187 for biography.

‡ Cf. Bottom of p. 806.

been comparatively little published concerning the plant life of the region. The following bibliography, while it does not profess to be complete, contains most of the publications which deal exclusively or mainly with the plants of this region. Various general works and papers, many of which are cited in synonymy or foot notes on the preceding pages, and a few of which are included here, also contain matter relative to the flora of Southern New Jersey.

- 1753-61. KALM, PETER.* *En Risa til Norra America*. Stockholm, III Vols., 484 pps.

Kalm spent some time at Philadelphia and at the Swedish settlements on the New Jersey side of the Delaware some miles below. Among the plants that he submitted to Linnaeus on his return to Sweden were a number from this vicinity.

1813. MUHLENBERG, HENRY, D.D.† *Catalogus Plantarum Americae Septentrionalis huc usque Cognitarum Indigenarum et Cicurum*; or a Catalogue of the Hitherto Known Native and Naturalized Plants of North America, arranged according to the Sexual System of Linnaeus. pp. I-IV + 1—112. Lancaster, Pa., 1813.

Contains southern New Jersey species, but in the absence of descriptions the names have no application.

1817. MUHLENBERG, HENRY, D.D. *Descriptio Ueberior Graminum et Plantarum Calamiarum Americae Septentrionalis Indigenarum et Cicurum*. pp. i-ii + 1-295. Philadelphia, 1817.

A posthumous work comprising the grasses and sedges of a proposed flora of North America, of which the Catalogue 1813 was a preliminary outline.

1814. PURSH, FREDERICK.‡ *Flora Americae Septentrionalis*; or a Systematic Arrangement and Description of the Plants of North America. London, 2 Vols., pp. I-XXXVI + 1-751, 24 plates.

* Cf. Darlington, *Memorials of Bartram and Marshall*, p. 367, 1849, for bibliographical sketch.

† Cf. *Pop. Sci. Mo.* XLV 689.

‡ Cf. *Bot. Gazette* VII, 141 for biography.

A classic work, in which the flora of southern New Jersey figured not a little, as Pursh was located at Philadelphia 1802-1805, and apparently spent a good deal of time in exploring the wilds of New Jersey.

1818. NUTTALL, THOMAS.† The Genera of North American plants, and a Catalogue of the Species to the Year 1817. Philadelphia, 2 Vols., I. i-viii + 1-312. II. 1-254.

Nuttall was in Philadelphia 1809-1818, and many of the new species described in his classic work were discovered on his numerous trips through southern New Jersey.

1818. BARTON, WILLIAM P. C.‡ Compendium Florae Philadelphicae, containing a description of the indigenous and naturalized plants found within a circuit of ten miles around Philadelphia. Philadelphia, 2 vols. 1-251, 1-234 pp.

This is the first local flora covering any part of our region. It included the shores of the Delaware from Paulsboro to Delanco, and inland as far as Moorestown and Blackwood.

This work has been freely consulted in the following pages, and synonymy cited wherever New Jersey is explicitly mentioned.

1819. TORREY, JOHN.§ A Catalogue of Plants growing spontaneously within thirty miles of the city of New York. Albany, N. Y., pp. 1-100.

Exact localities are not often mentioned in this work, and most statements of distribution are so broad that it is not always clear whether a species of rather general distribution occurs both in New Jersey and New York or only in the latter. More explicit information is in many cases to be found in the author's later *Flora of the United States*, 1824, Vol. I (all published).

1828. CONRAD, SOLOMON W.* Description of a new species of *Juncus*. *Jour. Acad. Nat. Sci., Phila.*, VI: 105.

J. viviparus = *J. pelocarpus*.

* Cf. *Pop. Sci. Mo.* XLVII, p. 257 for biography.

† Cf. *Pop. Sci. Mo.* XLVI, p. 689, 1895, for biography.

‡ Cf. Harshburger, *Botanists of Phila.*, 159, for biography.

§ Cf. *Bot. Gazette* VIII, 165, for biography.

1856. KNIESKERN, P. D. A Catalogue of Plants growing without cultivation in the Counties of Monmouth and Ocean. *Ann. Rept. N. J. Geol. Survey*, 1856.

Also reprinted as a pamphlet Trenton, N. J., 1857, pp. 1-41.

This is the most important paper on the Pine Barren flora that was published up to the time of Britton's Catalogue. It is cited in synonymy throughout the present work, the page references being those of the reprint. Dr. Knieskern lived at Manchester, now Lakehurst, and was undoubtedly better informed on the flora of that vicinity than any man of his time. A few species, however, which he included from the upper part of Monmouth County, have not since been collected there, and were probably based upon misidentifications.

1860. DARRACH, JAMES. Plants appearing in Flower in the Neighborhood of Philadelphia.

February-April, p. 145; May, p. 199; June, p. 302; July-October, 511. *Proc. Acad. Nat. Sci. Phila.*, 1860.

1869. REDFIELD, JOHN H.* Note on the First Discovery of *Schizæa pusilla*. *Proc. Acad. Nat. Sci. Phila.*, 1869. 13.

1869. REDFIELD, JOHN H. Search for *Corema Conradii* in Monmouth County, N. J. *Proc. Acad. Nat. Sci. Phila.*, 1869. 91. Also *Amer. Nat.* III., 327.

- . M[ARTINDALE], I. C. To the Lovers of Nature's Beauties.

Apparently a reprinted broadside from a newspaper, describing briefly the flora to be seen along the Camden and Atlantic R. R.

1871. HALL, I. H. [Helonias and other plants at Atco, N. J.] *Torr. Bull.* II. 31. III. 25 and 32.
1873. HALL, I. H. [Rose-colored Water Lilies near Atsion, N. J.] *Torr. Bull.* IV. 8.

1874. WILLIS, O. R., Ph. D.† Catalogue of Plants growing without cultivation in the State of New Jersey. New York. pp. i-xxi + 1-71. Revised edition, same title, New York 1878, pp. i-xxviii + 1-88.

* Cf. Bull. Torr. Bot. Club, XX., 162, for biography.

† Cf. Torrey II., 80, 1902, for Biographical Notice.

A list with few exact localities, generally referring broadly to the northern, middle or southern counties in stating distribution. All species referred to the last category are included in the synonymy of the present work, page reference being to the revised edition. Some very doubtful records originate in this list which have not been verified, and, so far as our territory is concerned, it contains few additions to the list of Dr. Knieskern.

1876. REDFIELD, J. H. Torrey's first trip to the Pines. *Torr. Bull.* VI. 82-83.

1876. MARTINDALE, I. C.* *Opuntia vulgaris* at Haddonfield, N. J. *Torr. Bull.* VI. 105 and 116.

1879. RUSBY, H. H. *Aletris aurea* ? near Atsion, N. J. *Torr. Bull.* VI., 289.

1880. BRITTON, N. L. On the Northern Extension of the New Jersey Pine Barren Flora on Long and Staten Islands. *Torr. Bull.* VII. 81, also VIII. 48, VII. 98.

1880. BROWN, ADDISON. Notes on the New Jersey Flora. *Torr. Bull.* VII. 115.

1881. BRITTON, N. L. Notes on the Middlesex County, New Jersey, Flora. *Torr. Bull.* VIII. 7.

1880. MARTINDALE, I. C. Notes on the Bartram Oak *Quercus Heterophylla* Michx. Privately printed. pp. 1-24.

1881. BRITTON, N. L. List of New Jersey Floras and Lists. *Torr. Bull.* VIII. 81.

1881. PORTER, T. C.† *Helonias* at Dover, Morris County. *Torr. Bull.* VIII. 91.

* Cf. *Torr. Bot. Club*, XX., 98, for biography.

† Cf. Harshberger *Botanists of Philadelphia and their work*. p. 236. for biography.

1881. BRITTON, N. L. A Preliminary Catalogue of the Flora of New Jersey—New Brunswick, N. J. pp. 1-233.
Merely preliminary to the Catalogue of 1884. Printed on one side of the paper for the purpose of reporting information for the later work.
1884. GROSS, C. A. Notes on New Jersey Plants. *Torr. Bull.* XI., p. 32.
1884. BRITTON, N. L. Range of *Phorodendron* in New Jersey. *Torr. Bull.* XI., 77, also S. Lockwood, p. 87.
1884. REDFIELD, J. H. *Corema conradii* and its Localities. *Torr. Bull.* XI., 97, also XII, 93. and XI, 117.
1886. LIGHTHIPE, L. H. Notes on the New Jersey Flora. *Torr. Bull.* XIII. 4.
1888. NORTHRUP, J. I. *Helonias* at Bridgeton. *Torr. Bull.* XV., 175.
1888. BRITTON, N. L. Plants at Seabright, New Jersey. *Torr. Bull.* XV, 193.
1889. BRITTON, N. L. Catalogue of Plants found in New Jersey. Final Report of the State Geologist, Vol. II, pt. 1. Trenton. pp. 1-642.

A carefully compiled work, with exact localities and authorities for all the rarer or restricted species. This Catalogue and the List of Keller and Brown served as a basis for the present work. Many of the records given are substantiated by specimens in the State Herbarium at New Brunswick, but by no means all, and Dr. Britton informs me that certain data submitted to the Geological Survey were incorporated at the request of the authorities without any specimens having been seen. So, also, records submitted by botanists of recognized standing were often included simply upon their authority. For the present work the effort has been made to verify all such records by the examination of an actual specimen, but there was not time to complete the work. The State Herbarium, and those of C. E. Smith, C. F. Parker, Benj. Heritage, I. C. Martindale, Isaac Burk, F. L. Bassett, Dr. Jos. Stokes, C. A. Gross and the Torrey Botanical Club have been consulted and many other records substantiated by subsequent collections in the Philadelphia Academy Herbarium. The records unverified are few and usually unimportant. They are marked (C) in the lists of localities. Dr. Britton's catalogue is quoted throughout in the synonymy.

1889. REDFIELD, J. H. *Corema* in New Jersey. *Torr. Bull.* XVI, 193.

1888. BRITTON, N. L. *Viola tenella* at Bridgeton, New Jersey. *Torr. Bull.* XV, 176.

1889. REDFIELD, JOHN H. Rediscovery of *Corema Conradii* in Monmouth County, New Jersey. *Proc. Acad. Nat. Sci.* Philadelphia, 1889. 135.

1890. BRITTON, N. L. *Nymphaea odorata rosea* at Cape May. *Torr. Bull.* XVII, 121.

1890. SMITH, J. B. Cranberry Culture in New Jersey. *Garden and Forest.* 1890, 535.

1890-1897. TREAT, MARY. A series of popular accounts of the Pine Barren Flora about Vineland, New Jersey, at various seasons. *Garden and Forcst.* III. 442, 463, 524, 534, 546. IV. 14, 188, 351. V. 220, 292, 363, 400, 435, 567. VI. 141, 314, 382, 443. VII. 102, 142, 212, 245, 302, 458, 482. VIII. 3, 103, 203, 262, 362, 452, 492. IX. 332, 412. X. 313, 411, 471.

These short sketches are marred by a certain amount of error in identification and by a lack of clearness as to just which plants are wild and which are growing in a wild garden, transplanted from elsewhere.

Such plants, also, as *Thuja occidentalis*, *Dalibarda repens*, *Coreopsis grandiflora*, *Gerardia auriculata*, *Smilax tamnoides* and *Nyssa aquatica* are casually mentioned as familiar Pine Barren species, none of which are known from the region. Certain other species are referred to in a way that would lead one to think they occurred near Vineland, while, in reality, they are found only on the coast or in West Jersey, not in the Pines.

1892. HARSHBERGER, J. W. Flora of the Barnegat Peninsula. *Garden and Forest.* 1892, 45.

1893. PETERS, JOHN E. Notes on the Flora of Southern New Jersey. *Bull. Torrey Bot. Club* XX, 294, 295.

1897. BERRY, E. W. The Pine Barren Plants of New Jersey. *Asa Gray Bull.* V., No. 2 and No. 5.
1898. SAUNDERS, C. F. Some Pine Barren Carices. *Asa Gray Bull.* VI., No. 2.
1899. VERMEULE, C. C. The Pine Belt of Southern New Jersey. *Ann. Rept. State Geol.* 1898. 185-193.
1900. VERMEULE, C. C. and PINCHOT, GIFFORD. The Forests of New Jersey. *Report on Forests, Ann. Rept. State Geol.* 1899, 13-172.
1900. HARSHBERGER, J. W. An Ecological Study of the New Jersey Strand Flora. *Proc. Acad. Nat. Sci., Phila.* 1900. pp. 623-671.

A number of the records contained in this paper are based upon misidentifications, while others from Cape May are not strand plants at all, the name having been used by the collectors to cover the country north of Cape May City, which is very different from the beach and salt meadows. The same is true of other localities as well.
1900. HOLLICK, ARTHUR. Relation between Forestry and Geology. *Report on Forests, Ann. Rept. State Geol.* 1899. 175-201.
1900. GIFFORD, JOHN. Forestal Conditions and Silvicultural Prospects of the Coastal Plain of New Jersey. *Report on Forests, Ann. Rept. State Geol.* 1899. 235-327.
1900. SAUNDERS, C. F. The Pine Barrens of New Jersey. *Proc. Acad. Nat. Sci., Phila.*, 1900. pp. 544-549.
1901. JELLETT, E. C. The Woodstown Lilies. *Amer. Botanist.* 190.
1902. HARSHBERGER, J. W. Additional Observations on the Strand Flora of New Jersey. *Proc. Acad. Nat. Sci.* 1902. 642-669.

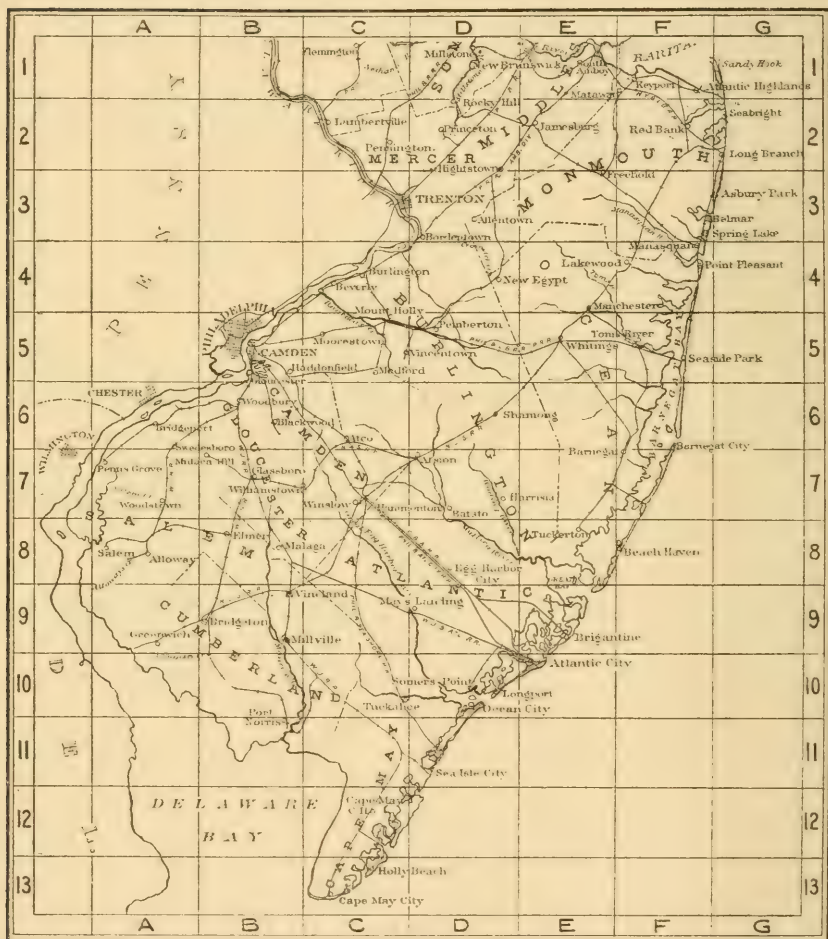
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1903. KAUFMAN, P. Gleanings from Sea and Mountain (Ocean Grove and Avon).^{*} *Amer. Botanist* 1903. 85-86.
1903. LIGHTHIEP, L. H. Flora of the Pine Barrens of New Jersey. *Torreyia* III. 79.
1903. HARSHBERGER, J. W. Forest Growth at Wildwood, New Jersey. *Forest Leaves* IX. 40.
1903. STONE, W. *Arisaema pusillum* in Pennsylvania and New Jersey. *Torreyia* 1903, p. 171.
1903. ROBINSON, B. L. A Hitherto Undescribed Pipewort from New Jersey. *Rhodora* V. 175.
1904. HARSHBERGER, J. W. The Comparative Age of the Different Floristic Elements of Eastern North America. *Proc. Acad. Nat. Sci. Phila.* 1904, 601-615.
1905. HARPER, R. M. Genus *Xyris*. *Torreyia* V. 128.
1905. KELLER, IDA A. AND BROWN, STEWARDSON. Handbook of the Flora of Philadelphia and Vicinity. Philadelphia, Pennsylvania, pp. i-viii and 1-360.

This work follows the plan of Britton's Catalogue and, so far as the New Jersey counties are concerned, is primarily based upon it with the addition of much valuable data furnished by members of the Philadelphia Botanical Club. Most of this is substantiated by specimens in the Club Herbarium. These I have examined and in addition have consulted the Herbaria of Stewardson Brown, Joseph Crawford, Thos. S. Githens, John W. Harshberger, Ida A. Keller, M. and A. Leeds, Chas. D. Lippincott, Benj. Heritage, Alex. McElwee, Benj. H. Smith, Chas. S. Williamson and Witmer Stone, so that only a few records originating in this work remain unverified. These are marked (KB) in the lists of localities under the various species, while records that have been found to be based upon misidentifications are referred to in foot-notes.

1907. HARPER, R. M. Centers of Distribution of Coastal Plain Plants. *Torrey* VII. 42.
1907. MACKENZIE, K. K. Range of *Vaccinium virgatum*. *Torrey* VII.
1907. ————— The Pine Barrens of New Jersey (reprint from New York Tribune). *Amer. Botanist* 1907, 103-108.
1907. STONE, W. The Life Areas of Southern New Jersey. *Proc. Acad. Nat. Sci. Phila.* 1907, 452-459.
1907. MACKENZIE, K. K. The Pine Barren Bellwort. *Torrey* VII. 13.
1907. LONG, BAYARD. *Gymnadeniopsis nivea* in New Jersey. *Torrey*, VII. 16.
1907. STONE, WITMER. *Rhynchospora rariflora* in New Jersey. *Torrey*, VII. 16.
1908. KAUFMAN, P. The Pine Barrens of Lakehurst, New Jersey. *American Botanist*, 1908, 104-106.
1908. HARPER, R. M. Pine Barrens of Long Island. *Torrey* VIII. 1.
1908. STONE, W. Recent Additions to our Knowledge of the Flora of Southern New Jersey. *Proc. Acad. Nat. Sci. Phila.* 1908, 457-459.
1909. BARTRAM, E. B. An Interesting Addition to the Flora of New Jersey. *Bassia hirsuta* (L.). *Rhodora* XI. p. 121.
1909. BROWN, O. H. [Some Cape May Records.] *Barton* I. 25.

1909. CRAWFORD, J. Some Sand Dune Plants from Longport. New Jersey. *Bartonia* I. 18-19.
1909. HARSHBERGER, J. W. The Vegetation of the Salt Marshes and of the Salt and Fresh Water Ponds of Northern Coastal New Jersey. *Proc. Acad. Nat. Sci. Phila.* 1909, 373-400.
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1909. MACKENZIE, K. K. Notes on *Sagittaria*. *Torreyia* IX. 30.
1909. STONE, W. The Coastal Strip of New Jersey and the Rediscovery of *Lilaeopsis*. *Bartonia* I. 20-24.
1909. TAYLOR, NORMAN. Local Flora Notes. *Torreyia* IX. 203, 257; X 80, 145.
1910. HARPER, R. M. A Quantitative Study of the More Conspicuous Vegetation of Certain Natural Divisions of the Coastal Plain as Observed in Traveling [by train] from Georgia to New York. *Torr. Bull.* XXXVII. 405.
1910. HARSHBERGER, J. W. Vegetation of the Navesink Highlands. *Torreyia* X. 1.
1910. LONG, BAYARD. Range Extension of *Scirpus Smithii* var. *setosus*. *Rhodora* XII. 155.
1910. LONG, B. *Pinus serotina* Michx. in New Jersey and Other Local Notes. *Bartonia* II. 17-21.
1910. STONE, W. New Plants for Southern New Jersey. *Bartonia* II. 27.

1910. STONE, W. *Brachiaria digitarioides* from New Jersey. *Bartonia* II. 26.
1910. MACKENZIE, K. K. A new species of Blueberry from New Jersey. *Torreya* X. 228
1911. BROWN, S. *Helonias bullata*. *Bartonia* III. 1.
1911. LA WALL, C. H. Botanical Notes from Longport, New Jersey. *Bartonia* III. 12-21.
1911. STONE, W. *Corema Conradii* in Ocean County, New Jersey, East of the Plains. *Bartonia* III. 26.
1911. BROWN, O. H. *Galium hispidulum* in Cape May County, New Jersey. *Bartonia* III. 26.
1911. VAN PELT, S. S. [Southern New Jersey plants.] *Bartonia* III. 29.
1911. LONG, B., and BROWN, S. [Flora of Farmingdale, N. J.] *Bartonia* III. 30-31.
1911. PENNELL, FRANCIS W. A new *Gerardia* from New Jersey. *Torreya* II. 15.



LIST OF LOCALITIES

From Which Specimens Are Recorded in the Preceding Pages.

Immediately following the name is reference to the accompanying map, which will indicate in which section the station is located. Only the principal localities are printed on the map, but most of the others can readily be found on the State Geological Survey Maps from the indication here given.

At the end of the line opposite each name are given the initials of the botanical district of southern New Jersey in which the station is located. Sometimes several districts may be represented in the immediately surrounding country, when the station is near the line of separation.

M = Middle District. PB = Pine Barrens. C = Coast District. CM = Cape May District.

Localities on the coast islands are marked 'island.'

| | |
|---|-------------|
| Absecon, E 9. | PB + C. |
| Albion, C 6. | M + PB. |
| The Middle District flora indents the Pine Barrens at this point. | |
| Allaire, F 3. | PB. |
| Alloway, A 8. | M. |
| Almonesson, B 6. | M. |
| Ancora, C 7. | PB. |
| Andrews, C 7. | PB + M. |
| Anglesea, C 12. | C (island). |
| Anglesea Jnc., C 12. | CM + C |
| Apple-pie Hill, D 6. | PB. |
| Arneys Mt., D 5. | M. |
| Asbury, B 6. | M. |
| Asbury Park, F 3. | C |

The northern extremity of the Pine Barrens lies just back of Asbury Park, and some elements of this flora are recorded from there.

- Ashland, B 6. M.
- Atlantic City, E 9. C (island).
- Atlantic Highlands, F 1. M.
- Atco, C 6. PB.
An indentation of the Middle District flora below Clementon reaches
nearly or quite to Atco.
- Atsion, D 7. PB.
A few Middle District species follow up the stream all the way to
Atsion.
- Avalon, D 12. C (island).
- Avon, F 3. C + M.
- Ballinger's Mill, C 6. PB.
Close to the western edge.
- Bamber, E 5. PB.
Formerly Ferago, now Cedar Crest.
- Barnegat, F 6. PB + C.
- Barnegat City, F 6. C (island).
- Barnegat Pier, F 5. C + PB.
- Barrel Island, E 8. C.
- Batsto, D 7. PB.
- Bayhead, F 4. PB + C.
- Bayside, A 9. M + C.
- Beaver Dam, B 10. M.
- Belmar, F 3. C + M.
- Bennett, C 13. CM.
- Berlin, C 6. PB.
Close to the western edge.
- Beach Haven North, F 8. C (island).
Now Brant Beach.
- Beach Haven North = Brant Beach.
- Beach Haven Terrace, F 8. C (island).

| | |
|-------------------------|---------|
| Beverly, C 4. | M. |
| Blackwood, B 6. | M. |
| Birmingham, D 3. | M. |
| Bradway, A 6. | M. |
| Bridgeton, B 9. | M |
| Bridgeport, A 6. | M. |
| Bordentown, D 3. | M. |
| Brielle, F 4. | C + M. |
| Browns Mills, D 5. | PB + M. |

Apparently close to the boundary line.

| | |
|----------------------------------|-------------|
| Brant Beach, F 8. | C (island). |
| Buckshutem, B 10. | M. |
| Burleigh, C 12. | CM. |
| Burlington, C 4. | M. |
| Camden, B 5. | M. |
| Cape May, C 13. | CM + C. |
| Bear Swamp, C 5. | PB. |
| Beesleys Pt., B 10. | C. |
| Belleplaine, C 10. | PB. |
| Buena, or Buena Vista, C 8. | PB? |

Apparently there is a strong Middle District element running up the streams at this point.

| | |
|----------------------------------|-----|
| Cape May Court House, C 12. | CM. |
|----------------------------------|-----|

There are certain Pine Barren elements here and there in the vicinity, while many coast plants from the marshes a mile to the east are recorded as from Court House.

| | |
|----------------------------|---------|
| Cape May Point, C 13. | CM + C. |
| Cassville, E 4. | PB? |
| Cedar Bridge, E 6. | PB. |
| Cedar Bonnet, E 8. | C. |
| Cedar Brook, E 7. | PB. |

| | |
|--|---------|
| Cedar Crest, E 5. | PB. |
| Same as Bamber and Ferago. | |
| Cedar Grove, E 7. | PB. |
| Cedar Lake, C 8, ... | PB. |
| Centerton, B 8. | M. |
| Center Square, A 6. | M. |
| Chatsworth, D 6. | PB. |
| Formerly called Shamong. | |
| Cinnaminson, C 5. | M. |
| Clarksboro, B 6. | M. |
| Clarksburg, E 3. | M. |
| Clementon, B 6. | M + PB. |
| The Pine Barrens begin right below the station. | |
| Clermont, C 11, ... | CM + C. |
| Collier's Mill, E 4. | M + PB |
| Collingswood, B 5. | M. |
| Cologne, D 5. | PB. |
| Como, F 3. | C + M? |
| Coopers Creek and Coopers Ferry, B 5. | M. |
| Court House = Cape May Court House. | |
| Crosswicks, D 3. | M. |
| Crowleytown, D 8. | PB + C. |
| The Coast Strip follows up the Egg Harbor river. | |
| Cox's, E 7. | C + PB. |
| Cold Spring, C 13. | CM + C. |
| Davenport, E 5. | PB. |
| Deal, F 3. | C + M? |
| Delair, B 5. | M. |
| Daretown, A 8. | M. |
| Delanco, C 4. | M. |

| | |
|---|---------|
| Dennisville, C 11. | CM + C. |
| Dias Creek, C 12. | CM + C. |
| Dividing Creek, B 10. | M + C. |
| Double Trouble, F 5. | PB. |
| Dover Forge, E 5. | PB. |
| Downstown, C 8. | PB (M?) |
| Eatontown, F 2. | M. |
| Egg Harbor of old authors = Beesley's Point. | |
| Egg Harbor City, D 8. | PB. |
| Eighth Street, C 8. | PB. |
| Part of a large settlement tract of which Hammonton was a part.
This is a wild spot where the extension of "Eighth St." crosses Hospi-
tality Branch. | |
| Elmer, B 8. | M. |
| Elsinboro Twp., A 8. | M. |
| Elwood, D 8. | PB. |
| Englishtown, E 2. | M. |
| Ewansville, D 5. | M. |
| Fairton, B 9. | M. |
| Fairview, B 6. | M. |
| Farmingdale, F 3. | M + PB. |
| Several Pine Barren tongues pass on either side of the town. | |
| Ferago, E 5. | PB. |
| Old name for Bamber, now Cedarcrest. | |
| Fish House, B 5. | M. |
| Florence or Florence Heights, C 4. | M. |
| Folsom, C 8. | PB. |
| Forked River, F 6. ° | PB + C. |
| Franklinville, B 8. | M. |
| Freehold, E 2. | M. |
| Glassboro, B 7. | M. |

| | |
|---------------------------------------|---------|
| Gloucester, B 5. | M. |
| Goshen, C 11. | CM. |
| Grenloch, B 6. | M. |
| Green Creek, C 12. | CM + C. |
| Green Bank, D 8. | PB + C. |
| Griffith's Swamp, B 5. near Lawnside. | |

A curious Pine Barren "island," now completely destroyed.

| | |
|---------------------------------------|-------------|
| Haddonfield, B 5. | M. |
| Halfway House, below Bonds, E 8. | C (island). |
| Hainesport, C 5. | M. |
| Haleyville, B 10. | M. |
| Hammonton, C 8. | PB. |

There are a number of Middle District plants in the neighborhood, largely due, no doubt, to the long settlement of the place, but apparently partly intruders from the coast via Hammonton creek.

| | |
|--|-------------|
| Hanover, E 5. | PB. |
| Hartford, C 5. | M. |
| Harvey Cedars, F 7. | C (island). |
| Herman, D 8. | PB + C. |
| High Bridge, E 6. | PB. |
| Holgates, F 8. | C (island). |
| Holly Beach, C 13. | C (island). |
| Holmdel, F 2. | M. |
| Hornerstown, D 4. | M. |
| Hospitality Bridge, E 6. | PB. |
| Same as Eighth St. | |
| Husted, B 8. | M. |
| Inskip, C 7. | PB. |
| Iona, B 8. | PB. |
| Island Heights and I. H. Junction, F 5. | PB + C. |
| Jackson, C 6. | PB. |

| | |
|---|-------------|
| Jericho, ... | M. |
| Joe's (or Job's) Bridge, D 7. | PB. |
| Jones Mill, D 6. | PB. |
| Jumbo, ... | M. |
| Kaighn's Point, B 5. | M. |
| Kenilworth, C 6. | PB. |
| Keyport, F 1, ... | M. |
| Kinkora, C 4. | M. |
| Kirkwood, B 6. | M. |
| Lacy, E 6. | PB. |
| Lakehurst, E 4. | PB. |
| Formerly Manchester. | |
| Lakewood, F 4. | PB. |
| Landisville, C 8. | PB. |
| The same prevalence of Middle district species as at Hammonton—
mainly due, I think, to long settlement, but <i>see</i> Buena. | |
| Little Timber Creek, B 5. | M. |
| Longacoming = Berlin. | |
| Long Branch, G 1. | C + M. |
| There is also a slight PB element a little to the west. | |
| Long Causway, E 6. | PB. |
| Longport, B 10. | C (island). |
| Lucaston, C 6. | PB. |
| Lumberton, D 5. | M. |
| Lawnside, B 5, ... | M. |
| Lindenwold, C 6. | M. |
| A bog with a curious mixture of M and PB species. | |
| Locust Grove, C 5. | M. |
| Magnolia, B 6. | M. |
| Malaga, B 8. | M + PB |
| About on the line. | |

| | |
|---|-------------|
| Manahawkin, E 7. | PB + C |
| Manasquan, F 4. | C + M. |
| Cf. Pt. Pleasant. | |
| Manchester = Lakehurst. | |
| Mantoloking, F 4. | C (island). |
| Mantua, B 6. | M. |
| Manumuskin, C 10. | PB + C. |
| Masonville, C 5. | M. |
| Mayetta, E 7. | C + PB. |
| Matawan, F 1, ... | M. |
| Mays' Landing, D 9. | PB + C. |
| The Coast Strip flora comes up the river to the Mays Landing dam. | |
| Mannington, A 8. | M. |
| Medford, C 5. | M. |
| Merchantville, B 5. | M. |
| Mickleton, A 6. | M. |
| Middletown, F 2. | M. |
| Millville, B 9. | PB + M. |
| Moorestown, C 5. | M. |
| Morris, B 5. | M. |
| Mount Ephraim, B 5. | M. |
| Mount Holly, C 5. | M. |
| Mullica Hill, B 7. | M. |
| Munyon Field, E 8. | PB. |
| Navesink, F 1. | M. |
| Newfield, B 8. | PB. |
| New Egypt, E 4. | M. |
| New England, C 13. | CM + C. |
| New Germany, C 8. | PB. |

| | |
|------------------------------|-------------|
| New Lisbon, D 5. | PB + M. |
| On the line. | |
| Newport, B 10. | M. |
| Newtonville, C 8. | PB. |
| North Beach Haven, F 8. | C (island). |
| Oaklyn, B 5. | M. |
| Ocean Beach = Belmar. | |
| Ocean City, D 10. | C (island). |
| Ocean Grove, F 3. | C. |
| Cf. Asbury Park. | |
| Ocean View, D 11. | C. |
| Orchard, B 5. | M. |
| Palatine, B 8. | M. |
| Palermo, D 11. | PB + C. |
| Pancoast, C 8. | PB |
| Parkdale, C 7. | PB. |
| Pasadena, E 5. | PB. |
| Paulsboro, B 6. | M. |
| Piermont, D 12. | C (island) |
| Peahala, F 8. | C (island). |
| Pemberton, D 5. | M. |
| Penbryn, C 6. | PB. |
| Pensauken, C 5. | M. |
| Pennsgrove, A 7. | M. |
| Petersburg, D 10. | PB. |
| Phalanx, F 2. | M. |
| Pipers Corner, C 6. | PB. |
| Pitman, B 7. | M. |
| Plains, E 6, E 7. | PB. |
| Pleasant Mills, D 8. | PB. |

Point Pleasant, F 4. C + M + PB.

A curious mixture in this vicinity, an arm of PB from the west and one of M to the north.

Prospertown, E 4. M.

Port Elizabeth, C 10. M (C + PB?).

Quaker Bridge, D 7. PB.

Quinton, A 8. M.

Rancocas, C 4. M.

Redbank, B 5. M.

Red Bank, F 2.* M.

Repaupo, B 6. M.

Riddleton, A 8. M.

Riverside, C 4. M.

Riverton, C 4. M.

Rio Grande, C 12. CM.

Salem, A 8. M.

Sandy Hook, F 1, ...C + M.

Sea Breeze, A 10. C.

Seabright, G 2. C + M.

Sea Girt, F 4. C + M (+ PB?)

Sea Haven, F 8. C (island).

Seaside Park, F 5. C (island).

Sea Isle City, D 11. C (island).

Sewell, B 6. M.

Sharpstown, A 7, ...M.

Sicklerville, C. 7. M.

Shark River, F 3. M.

Smithville, C 5. M.

* While the different capitalization here shown may not have been consistently followed in the text, the Redbank in Monmouth Co. is always near the beginning of the list of localities, as they are arranged from north to south.

- Somer's Point, D 10. C (+ PB?)
- Speedwell, D 6. PB.
- Spray Beach, F 8. C (island).
- Springdale, C 5. M.
- Spring Garden, C 7. PB.
- Spring Lake, F 3. C + M.
- Stafford Forge, E 7. PB.
- Swedesboro, A 7. M.
- Swimming River, F 2, ...M.
- Stoe Creek, A 8. M.
- Stone Harbor, C 12. C (island).
- Sumner, C 6. PB + M.
Nearly on the line.
- Tabernacle, D 6. PB.
Much cleared away.
- Taunton, C 6. PB + M.
About on the line.
- Timber Creek, B 5. M.
- Tomlin, B 6. M.
- Toms River, F 5. PB + C.
- Tuckahoe, C 10. PB + C.
- Tuckers, F 8. C (island).
- Tuckerton, E 8. PB + C.
- Twelfth St., C 8. PB.
At Hospitality Branch cf. "Eighth St."
- Union Grove, B 8. M.
- Ventnor, E 10. C (island).
- Vincentown, D 5. M.
- Vineland, B 9. PB.
Very much cleared and long settled, which accounts at least in part
for the Middle District element. Cf. Hammonton, Landisville and
Buena.
- Waretown, F 6. PB.

| | |
|---|-------------|
| Washington Park, B 5. | M. |
| Waterford, C 7. | PB. |
| Weekstown, D 8. | PB. |
| Wenonah, B 6. | M. |
| West Creek, E 7. | C + PB. |
| West Deptford, B 5. | M. |
| Apparently mainly in the vicinity of Washington Park. | |
| Westmont, B 5. | M. |
| Westville, B 5. | M. |
| Weymouth, C 8. | PB. |
| Whiskey Road, B 5. | M. |
| White House, D 6. | PB. |
| Whitesboro, C 12. | CM. |
| Whitings, E 5. | PB. |
| Williamstown Junction, C 7. | PB. |
| Willow Grove, B 8. | PB. |
| Winslow and Winslow Jnc., C 7. | PB. |
| Woodbine, C 11. | PB. |
| Woodbury, B 6. | M. |
| Woodstown, A 7. | M. |
| Woodmansie, E 6. | PB. |
| Wildwood, C 13. | C (island). |
| Wildwood Jnc., C 13. | CM. |
| Yorktown, A 8. | M. |

ACTUAL NUMBER OF SPECIES LISTED.

| | |
|-----------------------------------|-------|
| Ferns, etc., ... | 50 |
| Conifers, ... | 10 |
| Grasses, ... | 165 |
| Sedges, ... | 165 |
| Other Monocotyledons, ... | 161 |
| Dicotyledons (Polypetalae), ... | 461 |
| (Gamopetalae), ... | 389 |
| <hr/> | |
| Total, ... | 1,401 |

GLOSSARY.

Acaulescent. Stemless.

Achene. A small dry, one-seeded, non-splitting fruit.

Acuminate. Tapering at the end.

Amplexicaul. Clasping the stem.

Annual. Lasting but one year.

Anther. Terminal part of the stamen, bearing the pollen.

Apetalous. Without petals.

Arachnoid. Like cobwebs.

Aril. An appendage growing at the point of attachment of the seed.

Aristate. Awned, or provided with bristles.

Awn. A bristle-like appendage.

Axil. Junction of a leaf or branch with the stem.

Blade. The flat part of a leaf.

Bract. A modified leaf, usually subtending a flower.

Calyx. The outer part of the perianth of a flower; composed of the sepals.

Campanulate. Bell shaped.

Canescent. Gray-hairy.

Capitate. In heads.

Capsule. A dry non-splitting fruit of more than one carpel.

Cauline. Belonging to the stem.

Circumcissile. Splitting by a transverse circular line of division.

Cleistogamous. Fertilized in the bud, without the flower opening.

Coriaceous. Leathery.

Corolla. The inner part of the perianth, composed of the petals.

Corymb. A flat-topped flower cluster, the marginal flowers blooming first.

Cotyledons. The first leaves of the embryo as found in the seed.

Crenate. Dentate with rounded teeth.

Cyme. A flat-topped flower cluster, with the central or terminal flowers blooming first.

Dentate. Toothed.

Dichotomous. Forking regularly by pairs.

Dioecious. Staminate and pistillate flowers on separate plants.

Drupe. A fleshy fruit, with a hard, usually one-seeded "stone" (inner pericarp).

Emarginate. With a slight terminal notch.

Entire. Without teeth or divisions.

Exserted. Projecting beyond a surrounding covering, calyx, etc.

Falcate. Scythe-shaped.

Floret. A small flower; one of a cluster.

Gamopetalous. Having the petals of the corolla united.

Glabrate. Somewhat glabrous.

Glabrous. Smooth.

- Glume.* A chaff-like bract. In grasses, one of the two empty bracts at the base of a spikelet.
- Hastate.* Arrow shaped.
- Hirsute.* Coarsely or stiffly pubescent.
- Hispid.* With bristly hairs.
- Included.* Not protruding, opposite of exerted.
- Inflorescence.* The flowering portion of a plant.
- Innovation.* An offshoot from the stem.
- Involucre.* A circle of bracts, surrounding a flower or head of flowers.
- Leaflet.* One component of a compound leaf.
- Legume.* A pod-like fruit.
- Lemma.* The lower bract inclosing the flower in grasses.
- Ligule.* A flat strap-shaped corolla, as the ray flowers of a sunflower, also a scarious margin to the sheath of grasses.
- Loculicidal.* Splitting or opening by a slit on the top or back of a cell or pod.
- Monoecious.* Stamens and pistils in separate flowers on the same plant.
- Ocrea.* A tubular stipule.
- Palea.* The upper bract enclosing the flower of a grass.
- Panicle.* An irregular branching inflorescence, with the individual flowers pedicelled.
- Papilionaceous.* Having a pea-shaped blossom.
- Pappus.* A tuft usually of down or bristles at the summit of the seeds of Compositae; in reality part of the calyx.
- Peltate.* A shield-shaped leaf, etc., attached by the middle of the lower surface.
- Perianth.* The calyx and corolla of a flower.
- Perigynium.* The inflated covering of the seed in *Carex*.
- Persistent.* Remaining attached.
- Petal.* One of the divisions of the corolla.
- Petiole.* A leaf stem.
- Pinna.* One of the primary divisions of a fern frond, or a compound leaf.
- Pinnatifid.* Cut or divided into pinnæ.
- Pistil.* The seed-bearing organ of the flower, consisting of the ovary, stigma and style.
- Pollen.* The fertilizing powder contained on the anthers.
- Puberulent.* Minutely pubescent.
- Pubescent.* Covered with soft, or downy hairs.
- Raceme.* An elongate, simple inflorescence, with the flowers pedicelled.
- Ray.* Marginal flowers in Compositae; or the branch of an umbel.
- Receptacle.* The broadened tip of a stem, pedicel, etc., which bears the flower parts (or the flowers of a head).
- Rhachis.* The central stem, etc., of a spike or compound leaf.
- Samara.* A non-splitting winged fruit.
- Scabrous.* Rough and harsh.
- Scape.* A stem arising from the ground bearing only flowers.
- Sepal.* One of the divisions of the calyx.
- Serrate.* With sharp teeth directed forward.
- Sessile.* Without a stem of any sort.
- Sheath.* A tubular covering, such as the lower part of a grass leaf.

Sinus. A cleft between two lobes.

Spathe. A sheath-like bract covering an inflorescence.

Spadix. A fleshy spike stem or axis.

Spatulate. Gradually narrowed from a rounded terminal portion.

Spike. An elongate simple inflorescence, with the flowers sessile or nearly so.

Spikelet. A small spike; in grasses, one of the individual flowers or flower clusters with its bracts.

Stamen. One of the pollen bearing organs of the flower; the terminal portion is the anther.

Stipe. The stalk of the pistil, or leaf stalk of a fern.

Stipule. An appendage growing at the base of a petiole.

Stolon. A runner, which roots.

Terete. Circular in cross section.

Ternate. In threes.

Thyrse. A contracted, cylindrical panicle.

Tomentose. Densely wooly.

Umbel. An inflorescence in which the several branches spring from the same point.

Utricle. A small bladder-like body.

Viscid. Glutinous.

INDEX.

(811)

INDEX.

| | PAGE. | | PAGE. |
|--------------------------|----------|-----------------------------|-------|
| Abama, ... | 338 | Angelica, ... | 599 |
| Abutilon, ... | 549 | Antennaria, ... | 766 |
| Acalypha, ... | 526 | Anthemis, ... | 730 |
| Acer, ... | 544 | Anychia, ... | 442 |
| Acerates, ... | 651 | Apios, ... | 512 |
| Achillea, ... | 730 | Aplectrum, ... | 378 |
| Acnida, ... | 434 | Apocynum, ... | 645 |
| Acorus, ... | 317 | Apple, Crab, ... | 486 |
| Acroanthes, ... | 376 | Aquilegia, ... | 452 |
| Actæa, ... | 451 | Aralia, ... | 589 |
| Actinomeris, ... | 771 | Arbutus, ... | 619 |
| Adam-and-Eve, ... | 378 | Arctium, ... | 728 |
| Adder's Mouth, ... | 376 | Arctostaphylos, ... | 620 |
| Adder's Tongue, ... | 122 | Arenaria, ... | 437 |
| Yellow, ... | 346 | Arethusa, ... | 372 |
| Adiantum, ... | 130 | Arisaema, ... | 314 |
| Adicea, ... | 415 | Aristida, ... | 217 |
| Adopogon, ... | 719 | Aristolochia, ... | 418 |
| Aeschynomene, ... | 498 | Aronia, ... | 487 |
| Agastache, ... | 666 | Arrow Arum, ... | 315 |
| Agrimonia, ... | 483 | Arrowhead, Common, ... | 169 |
| Agrimony, ... | 483 | Long-beaked, ... | 171 |
| Agrostemma, ... | 436 | Sessile-fruited, ... | 171 |
| Alder, ... | 402 | Grass-leaved, ... | 172 |
| Black, ... | 540 | Subulate, ... | 172 |
| Aletris, ... | 347 | Arrow-grass, Seaside, ... | 166 |
| Alfalfa, ... | 496 | Arrow-wood, ... | 709 |
| Alisma, ... | 168 | Artemisia, ... | 775 |
| Allium, ... | 344 | Arum, Arrow, ... | 315 |
| Alnus, ... | 402 | Asclepias, ... | 647 |
| Alopecurus, ... | 222 | Ascyrum, ... | 552 |
| Alsine, ... | 436, 438 | Asarum, ... | 418 |
| Alum root, ... | 471 | Ash, ... | 635 |
| Amaranth, Coast, ... | 433 | Ash, Prickly, ... | 518 |
| Great, ... | 433 | Asimina, ... | 448 |
| Amaranthus, ... | 433 | Aspen, American, ... | 392 |
| Ambrosia, ... | 725 | Large-toothed, ... | 392 |
| Amelanchier, ... | 488 | Asphodel, Bog, ... | 338 |
| Ammodenia, ... | 441 | Asphodel, Viscid, ... | 337 |
| Ammophila, ... | 228 | Aspidium, ... | 133 |
| Amphicarpon, ... | 188 | Asplenium, ... | 132 |
| Amygdalus, ... | 490 | Aster, ... | 754 |
| Anaphalis, ... | 767 | Flat-topped, ... | 763 |
| Andromeda, Privet, ... | 618 | Golden, ... | 741 |
| Andropogon, ... | 182 | Stiff-leaved, ... | 764 |
| Anemone, ... | 452 | White-topped, ... | 753 |
| Canada, ... | 452 | Aster concolor, ... | 757 |
| Rue, ... | 454 | cordifolius, ... | 755 |
| Tall, ... | 452 | dumosus, ... | 760 |
| Wood, ... | 453 | ericoides, ... | 760 |

| | PAGE. | | PAGE. |
|-----------------------------|----------|---------------------------|----------|
| Aster divaricatus, ... | 755 | Bittersweet, ... | 543 |
| gracilis, ... | 758 | Blackberry, Sand, ... | 479 |
| lævis, ... | 757 | Bush, ... | 479 |
| lateriflorus, ... | 761 | Tall, ... | 479 |
| macrophyllus, ... | 755 | Hispid Swamp, ... | 480 |
| novæ-angliae, ... | 756 | Black-Haw, ... | 711 |
| novi-belgii, ... | 757 | Bladder-nut, ... | 543 |
| nemoralis, ... | 759 | Bladderwort, ... | 689 |
| patens, ... | 756 | Blazing Star, ... | 341, 740 |
| paniculatus, ... | 760 | Blephariglottis, ... | 367 |
| puniceus, ... | 757 | Bloodroot, ... | 461 |
| radula, ... | 759 | Blue Curls, ... | 664 |
| spectabilis, ... | 758 | Blueberry, ... | 624 |
| subulatus, ... | 761 | Blue-eyed Grass, ... | 360 |
| tenuifolius, ... | 761 | Blue-hearts, ... | 683 |
| undulatus, ... | 756 | Bluets, ... | 701 |
| vimineus, ... | 761 | Boehmeria, ... | 415 |
| Atriplex, ... | 429 | Bog Asphodel, ... | 338 |
| Avens, ... | 482 | Boltonia, ... | 753 |
| Azalea, ... | 612 | Bone-set, ... | 734 |
| | | Bone-set, Climbing, ... | 739 |
| Baccharis, ... | 764 | False, ... | 739 |
| Balsam Apple, Wild, ... | 713 | Botrychium, ... | 122 |
| Baneberry, Red, ... | 451 | Bouncing Bet, ... | 436 |
| White, ... | 451 | Box Elder, ... | 545 |
| Baptisia, ... | 496 | Brachyelytrum, ... | 221 |
| Barbarea, ... | 462 | Bracken, ... | 130 |
| Barton, B. S., ... | 642 | Bradburya, ... | 510 |
| Barton, W. P. C., ... | 553 | Brasenia, ... | 443 |
| Bartonia, ... | 642 | Brassica, ... | 462 |
| Bassia, ... | 432 | Breweria, ... | 652 |
| Basswood, ... | 548 | Brinton, J. B., ... | 509 |
| Batrachium, ... | 457 | Bromus, ... | 244 |
| Bayberry, ... | 395 | Brooklime, ... | 682 |
| Beach Pea, ... | 510 | Broomrape, ... | 694 |
| Bean, Wild, ... | 513 | Buchnera, ... | 683 |
| Bear-berry, ... | 621 | Buckbean, ... | 644 |
| Beard Grass, ... | 182 | Buck-thorn, ... | 546 |
| Beard-tongue, ... | 678 | Bugle-weed, ... | 672 |
| Bedstraw, ... | 704 | Bugloss, ... | 658 |
| Beech, ... | 402 | Vipers, ... | 658 |
| Beech-drops, ... | 695 | Bull Rush, ... | 269 |
| Beggars-ticks, ... | 773 | Bunch-flower, ... | 342 |
| Bell-flower, ... | 714 | Burdock, ... | 728 |
| Bellwort, Perfoliate, ... | 343 | Bur-Marigold, ... | 772 |
| Sessile-leaved, ... | 343 | Burk, Isaac, ... | 696 |
| Pine Barren, ... | 343 | Burnet, ... | 484 |
| Benjoin, ... | 460 | Burning Bush, ... | 542 |
| Bergamot, ... | 668 | Bur-reed, ... | 159 |
| Betula, ... | 400 | Large, ... | 159 |
| Bicuculla, ... | 461 | Slender, ... | 159 |
| Bidens, ... | 772 | Bursa, ... | 462 |
| Bindweed, ... | 426, 653 | Bush, Burning, ... | 542 |
| Birch, White, ... | 400 | Strawberry, ... | 542 |
| Cherry, ... | 401 | Bush-clover, ... | 506 |
| Sweet, ... | 401 | Buttercups, ... | 450, 456 |
| River, ... | 401 | Butternut, ... | 397 |
| Red, ... | 401 | Butterfly weed, ... | 647 |
| Bishop-weed, Mock, ... | 598 | Button-bush, ... | 702 |
| Bishop's Cap, ... | 472 | Button weed, ... | 703 |

| | PAGE. | | PAGE. |
|--------------------------|-------------------|-----------------------------------|-------|
| Button wood, ... | 474 | Carex limosa, ... | 297 |
| Cabbage, Skunk, ... | 316 | livida, ... | 303 |
| Cacti, ... | 573 | lupuliformis, ... | 292 |
| Cakile, ... | 463 | lupulina, ... | 292 |
| Calamagrostis, ... | 227 | lurida, ... | 293 |
| Calamovilfa, ... | 228 | monile, ... | 292 |
| Calamus, ... | 317 | muhlenbergii, ... | 307 |
| Callitriche, ... | 529 | nigromarginata, ... | 308 |
| Caltha, ... | 450 | oblita, ... | 299 |
| Camelina, ... | 462 | pallescens, ... | 301 |
| Camomile, ... | 730 | patulifolia, ... | 302 |
| Campanula, ... | 714 | pedunculata, ... | 304 |
| Campion, ... | 436, 437 | pennsylvanica, ... | 303 |
| Canby, W. M., ... | 718 | polymorpha, ... | 301 |
| Cape May District, ... | 92, 367, 695, 738 | prasina, ... | 297 |
| Capnoides, ... | 461 | riparia, ... | 294 |
| Cardamine, ... | 464 | rosea, ... | 307 |
| Cardinal Flower, ... | 715 | scabrata, ... | 295 |
| Carduus, ... | 778 | scoparia, ... | 310 |
| Carex, ... | 285 | seorsa, ... | 309 |
| Carex abscondita, ... | 303 | silicea, ... | 311 |
| alata, ... | 312 | squarrosa, ... | 294 |
| albullescens, ... | 313 | stipata, ... | 306 |
| annectans, ... | 307 | straminea, ... | 311 |
| atlantica, ... | 309 | stricta, ... | 296 |
| barratii, ... | 297 | styloflexa, ... | 302 |
| brevior, ... | 312 | swanii, ... | 298 |
| brunescens, ... | 310 | tenuis, ... | 299 |
| bullata, ... | 292 | tetanica, ... | 301 |
| buxbaumii, ... | 296 | tonsa, ... | 304 |
| canescens, ... | 310 | tribiloides, ... | 311 |
| capillacea, ... | 308 | triceps, ... | 298 |
| caroliniana, ... | 299 | trichocarpa, ... | 294 |
| cephalantha, ... | 309 | trisperma, ... | 310 |
| cephalophora, ... | 307 | typhinoidea, ... | 294 |
| collinsii, ... | 290 | umbellata, ... | 304 |
| comosa, ... | 293 | utriculata, ... | 292 |
| conoidea, ... | 301 | varia, ... | 304 |
| crinita, ... | 298 | vestita, ... | 295 |
| digitalis, ... | 302 | vulpinoidea, ... | 306 |
| disjuncta, ... | 310 | walteriana, ... | 295 |
| emmonsi, ... | 304 | wildenovii, ... | 305 |
| exilis, ... | 306 | Carpetweed, ... | 434 |
| festucea, ... | 312 | Carpinus, ... | 399 |
| flava, ... | 300 | Carrian Flower, ... | 351 |
| folliculata, ... | 291 | Hair, ... | 351 |
| glaucodea, ... | 300 | Carrot, ... | 591 |
| granularis, ... | 300 | Carrot, Wild, ... | 591 |
| grisea, ... | 300 | Cassandra, ... | 619 |
| gynandra, ... | 298 | Cassia, ... | 493 |
| harperi, ... | 305 | Castalia, ... | 445 |
| hormathodes, ... | 312 | Castanea, ... | 403 |
| hystericina, ... | 293 | Castilleja, ... | 687 |
| interior, ... | 308 | Cat Gut, ... | 498 |
| intumescens, ... | 291 | Catch-fly, Night-flowering, ... | 436 |
| lacustris, ... | 294 | Stickey, ... | 437 |
| lanuginosa, ... | 296 | Sleepy, ... | 438 |
| laxiculmis, ... | 303 | Cat-nip, ... | 662 |
| laxiflora, ... | 301 | Cat-tail, ... | 158 |
| leptalea, ... | 305 | Coast, ... | 158 |

| | PAGE. | | PAGE. |
|---------------------------|----------|----------------------------------|--------------|
| Ceanothus, ... | 546 | Clitoria, ... | 511 |
| Cedar, White, ... | 151 | Clotbur, ... | 226 |
| Red, ... | 153 | Clovers, ... | 496 |
| Celandine, ... | 460 | Clover, Bush, ... | 506 |
| Celastrus, ... | 543 | Club Moss, ... | 140 |
| Celery, Wild, ... | 173 | Club Rush, ... | 267 |
| Celtis, ... | 413 | Coast Strip, ... | 88, 579, 775 |
| Century, ... | 638 | Cockle, Corn, ... | 435 |
| Cephalanthus, ... | 702 | Colic Root, ... | 347 |
| Cerastium, ... | 436, 437 | Collins, Zaccheus, ... | 290 |
| Ceratophyllum, ... | 446 | Collinsonia, ... | 675 |
| Cercis, ... | 493 | Columbine, Wild, ... | 452 |
| Chaerophyllum, ... | 595 | Comandra, ... | 418 |
| Chaetochloa, ... | 212 | Commelina, ... | 326 |
| Chaffseed, ... | 687 | Comptonia, ... | 396 |
| Chamaecyparis, ... | 151 | Cone-flower, ... | 769 |
| Chamaedaphne, ... | 619 | Conopholis, ... | 695 |
| Chamaelirium, ... | 341 | Conrad, S. W., ... | 530 |
| Chamaenerion, ... | 582 | Convolvulus, ... | 653 |
| Chelidonium, ... | 460 | Coral-root, ... | 379 |
| Chelone, ... | 678 | Corallorhiza, ... | 379 |
| Chenopodium, ... | 428 | Corema, ... | 530 |
| Cherry, Ground, ... | 675 | Coreopsis, ... | 771 |
| Sour, ... | 490 | Corn Salad, ... | 713 |
| Sweet, ... | 490 | Cornels, ... | 602 |
| Wild, ... | 492 | Cornus, ... | 601 |
| Chervil, Spreading, ... | 595 | Corydalis, Pale, ... | 461 |
| Chess, Wood, ... | 245 | Corylus, ... | 400 |
| Chestnut, ... | 403 | Cotton Grass, ... | 273 |
| Chickweed, ... | 436, 439 | Cowbane, ... | 600 |
| Chickweed, Forked, ... | 442 | Cowslip, Virginia, ... | 658 |
| Chickory, ... | 718 | Cow-wheat, ... | 688 |
| Chimaphila, ... | 610 | Coelorachis, ... | 181 |
| Chinquapin, ... | 403 | Crab Apple, Narrow-leaved, ... | 486 |
| Chionanthus, ... | 636 | Cracca, ... | 498 |
| Chokeberry, Red, ... | 487 | Cranberry, ... | 627 |
| Black, ... | 487 | Crataegus, ... | 489 |
| Purple-fruited, ... | 487 | Creeper, Trumpet, ... | 695 |
| Chondrophora, ... | 742 | Creeper, Virginia, ... | 548 |
| Christmas green, ... | 143 | Cress, Bitter, ... | 464 |
| Chroserma, ... | 341 | Bulbous, ... | 464 |
| Chrysanthemum, ... | 730 | Hispid, ... | 463 |
| Chrysopsis, ... | 741 | Marsh, ... | 464 |
| Chrysosplenium, ... | 472 | Pennsylvania, ... | 465 |
| Cichorium, ... | 718 | Rock, ... | 466 |
| Cicuta, ... | 596 | Round-leaved, ... | 464 |
| Cimicifuga, ... | 451 | Winter, ... | 462 |
| Cinna, ... | 224 | Yellow, ... | 463 |
| Cinquefoil, ... | 482 | Crotalaria, ... | 497 |
| Rough, ... | 475 | Crotonopsis, ... | 526 |
| Dwarf, ... | 482 | Crowberry, Conrad's, ... | 530 |
| Tall, ... | 481 | Crowfoot, ... | 454 |
| Circaea, ... | 585 | Cucumber, Indian, ... | 350 |
| Clammy-weed, ... | 466 | Star, ... | 714 |
| Claytonia, ... | 435 | Cud weed, ... | 768 |
| Clearweed, ... | 415 | Culver's Root, ... | 683 |
| Cleavers, ... | 704 | Cunila, ... | 671 |
| Clematis, ... | 454 | Cuphea, Clammy, ... | 576 |
| Clethra, ... | 608 | Curly Grass, ... | 125 |
| Clinopodium, ... | 669 | Cuscuta, ... | 654 |

| | PAGE. | | PAGE. |
|----------------------------|-------|------------------------------|----------|
| Cyperus cylindricus, ... | 255 | Dog-toothed Violet, ... | 346 |
| Cyperus dentatus, ... | 251 | Dogwood, ... | 601 |
| diandrus, ... | 250 | Dondia, ... | 432 |
| dipsaciformis, ... | 254 | Draba, ... | 462, 465 |
| erythrorhizos, ... | 252 | Dropseed, ... | 223 |
| esculentus, ... | 252 | Orosera, ... | 468 |
| filiculmis, ... | 256 | Drymocallis, ... | 481 |
| flavescens, ... | 249 | Dryopteris, ... | 133 |
| grayii, ... | 255 | Duckweed, ... | 318 |
| hystricinus, ... | 253 | Dulichium, ... | 256 |
| launcastrisensis, ... | 253 | Dutchman's Breeches, ... | 461 |
| macilentus, ... | 256 | | |
| microdontos, ... | 251 | Eatonia, ... | 230 |
| nuttallii, ... | 250 | Echium, ... | 658 |
| ovularis, ... | 254 | Eel Grass, ... | 166 |
| pseudovegetus, ... | 251 | Elatine, ... | 558 |
| retrofractus, ... | 254 | Elder, ... | 708 |
| rivularis, ... | 250 | Box, ... | 543 |
| speciosus, ... | 252 | Marsh, ... | 725 |
| strigosus, ... | 253 | Elm, Red, ... | 413 |
| Cynoglossum, ... | 658 | White, ... | 412 |
| Cynthia, ... | 719 | Eleocharis acicularis, ... | 260 |
| Cyperus, ... | 248 | engelmanni, ... | 260 |
| Cypress, Bald, ... | 151 | glaucescens, ... | 260 |
| Cypridium, ... | 363 | interstincta, ... | 258 |
| | | melanocarpa, ... | 262 |
| Daisy, Ox-eye, ... | 730 | obtusata, ... | 259 |
| Dalibarda, ... | 481 | occreata, ... | 259 |
| Dandelion, ... | 718 | olivacea, ... | 259 |
| Dwarf, ... | 719 | palustris, ... | 260 |
| Danthonia, ... | 231 | quadrangulata, ... | 258 |
| Darlington, Wm., ... | 529 | robbinsii, ... | 258 |
| Dasystoma, ... | 684 | rostellata, ... | 264 |
| Datura, ... | 674 | tenuis, ... | 263 |
| Decodon, ... | 575 | torreyana, ... | 261 |
| Deerberry, ... | 624 | tortilis, ... | 263 |
| Dendrium, ... | 615 | tricostata, ... | 262 |
| Dentaria, ... | 465 | tuberculosa, ... | 261 |
| Denstaedtia, ... | 136 | Eleocharis, ... | 258 |
| Deringa, ... | 597 | Elymus, ... | 245 |
| Deschampsia, ... | 229 | Epigaea, ... | 619 |
| Dew Berry, ... | 480 | Epilobium, ... | 582 |
| Dianthera, ... | 697 | Equisetum, ... | 138 |
| Dianthus, ... | 436 | Eragrostis, ... | 237 |
| Dichromena, ... | 264 | Erechtites, ... | 776 |
| Diervilla, ... | 712 | Erianthus, ... | 181 |
| Diodia, ... | 703 | Erigeron, ... | 762 |
| Dioscorea, ... | 357 | Eriocaulon, ... | 323 |
| Diospyros, ... | 634 | Eriophorum, ... | 273 |
| Diplachne, ... | 237 | Eryngium, ... | 594 |
| Dirca, ... | 574 | Erythronium, ... | 346 |
| Distichlis, ... | 239 | Eupatorium, ... | 732 |
| Dittany, ... | 671 | ageratoides, ... | 738 |
| Doch, Bitter, ... | 419 | album, ... | 734 |
| Yellow, ... | 419 | aromaticum, ... | 738 |
| Swamp, ... | 421 | coelestinum, ... | 738 |
| Dock, Spatter, ... | 444 | hyssopifolium, ... | 735 |
| Dodder, ... | 654 | leucoclepis, ... | 734 |
| Doellingeria, ... | 763 | maculatum, ... | 733 |
| Dog bane, ... | 645 | perfoliatum, ... | 737 |

| | PAGE. | | PAGE. |
|-----------------------------|-------|---------------------------------|-------|
| Eupatorium pubescens, ... | 736 | Galactia, ... | 512 |
| purpureum, ... | 733 | Galearis, ... | 364 |
| resinosum, ... | 737 | Galinsoga, ... | 729 |
| rotundifolium, ... | 736 | Galium, ... | 704 |
| sessilifolium, ... | 736 | Garlic, Meadow, ... | 345 |
| subvenosum, ... | 735 | Gaultheria, ... | 620 |
| verbenaefolium, ... | 735 | Gaura, ... | 585 |
| Euphorbia, ... | 527 | Gaylussacia, ... | 623 |
| Euthamia, ... | 751 | Gay-wings, ... | 525 |
| Everlasting, ... | 767 | Gentians, ... | 640 |
| Evonymus, ... | 542 | Gentian, Horse, ... | 711 |
| | | Gentiana, ... | 640 |
| Fagus, ... | 402 | Geranium, ... | 514 |
| Falcata, ... | 511 | Gerardia, ... | 655 |
| Feather foil, ... | 630 | Germander, ... | 663 |
| Fern, Broad Beech, ... | 136 | Geum, ... | 482 |
| Chain, ... | 131 | Gill-over-the-ground, ... | 662 |
| Christmas, ... | 133 | Ginger, Wild, ... | 418 |
| Cinnamon, ... | 124 | Ginseng, Dwarf, ... | 590 |
| Clayton's, ... | 125 | Glass wort, ... | 430 |
| Climbing, ... | 129 | Glaux, ... | 633 |
| Ebony, ... | 132 | Glechoma, ... | 662 |
| Grape, ... | 122 | Goat's Rue, ... | 498 |
| Oak, ... | 136 | Golden Club, ... | 317 |
| Ostrich, ... | 137 | Golden-crest, ... | 355 |
| Royal, ... | 124 | Goldenrods, ... | 742 |
| Sensitive, ... | 137 | Rayless, ... | 742 |
| Silvery, ... | 132 | Gooseberry, Wild, ... | 473 |
| Sweet-scented, ... | 136 | Goosefoot, Narrow-leaved, ... | 428 |
| Sweet, ... | 396 | Bosc's, ... | 429 |
| Festuca, ... | 243 | Red, ... | 429 |
| Fever wort, ... | 711 | Gnaphalium, ... | 767 |
| Fig wort, ... | 678 | Grapes, ... | 546 |
| Filix, ... | 135 | Grass-pink, ... | 372 |
| Fimbristylis, ... | 265 | Grass-of-Parnassus, ... | 470 |
| Fire Weed, ... | 582 | Gratiola, ... | 679 |
| Fire weed, White, ... | 776 | Green brier, ... | 352 |
| Flag, Blue, ... | 359 | Glaucous-leaved, ... | 353 |
| Slender, ... | 350 | Laurel-leaved, ... | 353 |
| Flax, ... | 517 | Walter's, ... | 354 |
| False, ... | 462 | Green Dragon, ... | 315 |
| Wild, ... | 517 | Gromwell, Corn, ... | 658 |
| Yellow, ... | 517 | False, ... | 659 |
| Fleabane, ... | 762 | Ground Cherry, ... | 675 |
| Fleabane, Marsh, ... | 765 | Ground-Nut, ... | 512 |
| Floating Hart, ... | 644 | Ground Pine, ... | 142 |
| Flowering Data, ... | 115 | Groundsel Bush, ... | 764 |
| Fly-poison, ... | 341 | Gum, Sour, ... | 603 |
| Fog-fruit, ... | 661 | Sweet, ... | 474 |
| Forget-me-not, ... | 659 | Gymnadeniopsis, ... | 365 |
| Fox love, False, ... | 684 | Gymnopogon, ... | 234 |
| Fox-tail Grass, ... | 213 | Gyrostachys, ... | 373 |
| Fox-tail, Marsh, ... | 222 | Gyrotheca, ... | 354 |
| Fragaria, ... | 481 | Grass, Arrow, ... | 166 |
| Fraxinus, ... | 635 | Beard, ... | 182 |
| Fringe Tree, ... | 636 | Bent, ... | 225 |
| Frog's Bit, ... | 173 | Black, ... | 330 |
| Frost weed, ... | 559 | Black Oat, ... | 219 |
| Fuirena, ... | 274 | Blue-eyed, ... | 360 |
| | | Blue Joint, ... | 227 |

| | PAGE. | | PAGE. |
|-------------------------------|----------|-------------------------------|----------|
| Bottle-brush, ... | 246 | Hellebore, False, ... | 342 |
| Cotton, ... | 273 | Helonias, ... | 340 |
| Dropseed, ... | 223 | Hemlock, ... | 150 |
| Eel, ... | 166 | Hemlock, Water, ... | 596 |
| Fescue, ... | 244 | Hemp, Indian, ... | 645 |
| Finger, ... | 188 | Water, ... | 434 |
| Fox-tail, ... | 213 | Hepatica, ... | 453 |
| Gama, ... | 180 | Heracleum, ... | 601 |
| Hair, ... | 221, 229 | Herb, Robert, ... | 515 |
| Herd, ... | 225 | Hercules Club, ... | 589 |
| Hedge-hog, ... | 214 | Heteranthera, ... | 327 |
| Holy, ... | 216 | Heuchera, ... | 471 |
| Indian, ... | 184 | Hibiscus, ... | 550 |
| Manna, ... | 241 | Hicoria, ... | 597 |
| Marsh, ... | 232 | Hickory, Bitternut, ... | 399 |
| Millet, ... | 188 | Mocker-Nut, ... | 398 |
| Nut, ... | 252 | Pig-nut, ... | 398 |
| Oat, ... | 231 | Shag-bark, ... | 398 |
| Orange, ... | 557 | Shell-bark, ... | 398 |
| Panic, ... | 189 | Small-fruited, ... | 399 |
| Plume, ... | 181 | Hieracium, ... | 722 |
| Poverty, ... | 217 | Hoarhound, Water, ... | 672 |
| Rattlesnake, ... | 241 | Holly, ... | 539 |
| Reed Canary, ... | 216 | Holly, Mountain, ... | 541 |
| Reed Meadow, ... | 243 | Homalocenchrus, ... | 215 |
| Rice, ... | 216 | Honiwort, ... | 597 |
| Rough Hair, ... | 226 | Honeysuckle, ... | 612, 712 |
| Rush, ... | 222 | Hop Hornbeam, ... | 400 |
| Salt Meadow, ... | 233 | Hop Tree, Three-leaved, ... | 517 |
| Salt Reed, ... | 233 | Hornbeam, ... | 399 |
| Sand, ... | 230 | Hop, ... | 400 |
| Sand Reed, ... | 228 | Horse Gentian, ... | 711 |
| Spear, ... | 249 | Horse-mint, ... | 668 |
| Spike, ... | 239 | Horse Nettle, ... | 675 |
| Spreading Meadow, ... | 243 | Horsetail, Field, ... | 138 |
| Thin, ... | 226 | Swamp, ... | 138 |
| Water Star, ... | 327 | Horse-weed, ... | 763 |
| White, ... | 215 | Hottonia, ... | 630 |
| Witch, ... | 195 | Hounds Tongue, ... | 658 |
| Wood Reed, ... | 224 | Houstonia, ... | 701 |
| Wool, ... | 272 | Hudsonia, ... | 560 |
| Yellow-eyed, ... | 320 | Hydrangea, ... | 472 |
| | | Hydrocotyle, ... | 592 |
| Hachberry, ... | 413 | Hydrophyllum, ... | 657 |
| Hair-Grass, Long awned, ... | 221 | Hypericum, ... | 553 |
| Hamamelis, ... | 473 | Hypopitys, ... | 611 |
| Hardhack, ... | 477 | Hypoxis, ... | 355 |
| Hawkweed, ... | 772 | Hyssop, Giant, ... | 666 |
| Hazel, Witch, ... | 473 | Hedge, ... | 679 |
| Hazel-Nut, ... | 490 | Hystrix, ... | 246 |
| Heather, Beach, ... | 560 | | |
| Pine Barren, ... | 561 | Ilex, ... | 539 |
| Hedeoma, ... | 668 | Ilicoides, ... | 511 |
| Hedge Nettle, ... | 667 | Ilysanthes, ... | 680 |
| Hedge-hog Grass, ... | 214 | Impatiens, ... | 545 |
| Helenium, ... | 774 | Indian Cucumber, ... | 350 |
| Helianthemum, ... | 559 | Hemp, ... | 615 |
| Helianthium, ... | 169 | Physic, ... | 478 |
| Helianthus, ... | 769 | Pipe, ... | 611 |
| Heliosis, ... | 768 | Plantain, ... | 776 |

| | PAGE. | | PAGE. |
|---------------------------|-------|----------------------------------|----------|
| Indian Tobacco, ... | 715 | Leptilon, ... | 763 |
| Indigo, Wild, ... | 496 | Leptorchis, ... | 377 |
| Inkberry, ... | 540 | Lespedeza, ... | 505 |
| Ionactis, ... | 764 | Lespedeza angustifolia, ... | 509 |
| Ipecac, Wild, ... | 528 | capitata, ... | 509 |
| Ipomœa, ... | 653 | frutescens, ... | 508 |
| Iris, ... | 359 | hirta, ... | 508 |
| Iron weed, ... | 730 | nuttallii, ... | 507 |
| Iron-wood, ... | 400 | oblongifolia, ... | 509 |
| Isanthus, ... | 664 | procumbens, ... | 506 |
| Isnardia, ... | 580 | repens, ... | 506 |
| Isoetes, ... | 144 | striata, ... | 506 |
| Isotria, ... | 371 | stuvci, ... | 507 |
| Itea, ... | 472 | violacea, ... | 507 |
| Iva, ... | 725 | virginica, ... | 508 |
| Ivy, Ground, ... | 662 | Lettuce, ... | 720 |
| Poison, ... | 536 | Leucothoe, ... | 617 |
| Jacob's Ladder, ... | 657 | Lilæopsis, ... | 598 |
| Jack-in-the-Pulpit, ... | 314 | Lilium, ... | 345 |
| Dwarf, ... | 314 | Lily, Canada, ... | 346 |
| Jewel-week, ... | 545 | Red, ... | 345 |
| Jimson Weed, ... | 674 | Turk's cap, ... | 346 |
| Joe-pye Weed, ... | 733 | Water, ... | 445 |
| Joint weed, ... | 427 | Yellow, ... | 346 |
| Judas, ... | 493 | Lily-of-the-Valley, False, ... | 349 |
| Juglans, ... | 397 | Limnanthemum, ... | 644 |
| Juncoïdes, ... | 336 | Limnobiom, ... | 173 |
| Juncus, ... | 329 | Limodorum, ... | 372 |
| Juniper, ... | 153 | Limonium, ... | 633 |
| Juniperus, ... | 153 | Limosella, ... | 681 |
| Kalm. Peter, ... | 616 | Linaria, ... | 677 |
| Kalmia, ... | 616 | Linden, ... | 548 |
| Kinnikinnick, ... | 602 | Linum, ... | 517 |
| Knawel, ... | 437 | Lippia, ... | 661 |
| Kneiffia, ... | 584 | Liquidambar, ... | 474 |
| Knotgrass, ... | 424 | Liquorice, Wild, ... | 705 |
| Knotweed, ... | 424 | Liriodendron, ... | 448 |
| Koellia, ... | 669 | Listera, ... | 375 |
| Kosteletzky, ... | 549 | Lithospermum, ... | 658 |
| Kuhnia, ... | 739 | Liverwort, ... | 453 |
| Lacinaria, ... | 740 | Lizard's Tail, ... | 390 |
| Lactuca, ... | 720 | Lobelia, ... | 715 |
| Ladies' Tresses, ... | 373 | Locust, ... | 495 |
| Lamium, ... | 662 | Clammy, ... | 495 |
| Lappula, ... | 658 | Lonicera, ... | 712 |
| Lathyrus, ... | 510 | Loose strife, ... | 574, 631 |
| Laurel, ... | 616 | Lophiola, ... | 355 |
| Sheep, ... | 616 | Lophotocarpus, ... | 169 |
| Lavender, Sea, ... | 633 | Lotus, American, ... | 446 |
| Leah, Wild, ... | 344 | Lousewort, ... | 687 |
| Leather-leaf, ... | 619 | Ludvigia, ... | 580 |
| Leatherwood, ... | 574 | Ludwigiantha, ... | 579 |
| Lechea, ... | 562 | Lupine, Wild, ... | 497 |
| Lemna, ... | 318 | Lupinus, ... | 497 |
| Leonurus, ... | 662 | Lycopodium, ... | 140 |
| Lipidium, ... | 462 | Lycopsis, ... | 658 |
| Leptamnium, ... | 695 | Lycopus, ... | 672 |
| Leptandra, ... | 683 | Lygodium, ... | 129 |
| | | Lysimachia, ... | 631 |
| | | Lythrum, ... | 574 |

| | PAGE. | | PAGE. |
|---|-------------------|----------------------------------|----------|
| Magnolia, Swamp, ... | 446 | Mitella, ... | 472 |
| Maidenhair, ... | 130 | Moccasin Flower, ... | 363 |
| Mallow, ... | 549 | Moehringia, ... | 441 |
| Malus, ... | 486 | Mollugo, ... | 434 |
| Malva, ... | 549 | Monarda, ... | 668 |
| Maple, ... | 544 | Monkey-flower, ... | 679 |
| Marigold, Bur, ... | 772 | Monotropa, ... | 611 |
| Marsh, ... | 450 | Moonseed, ... | 459 |
| Maritime Flora, ... | 95, 228, 233, 430 | Morning Glory, ... | 652 |
| Martindale, I. C., ... | 370 | Morus, ... | 414 |
| Matteucia, ... | 137 | Moss, Club, see Club-moss, ... | |
| May Apple, ... | 459 | Moss, Pink, ... | 657 |
| Meadow Beauty, ... | 576 | Mother-wort, ... | 662 |
| Meadow Sweet, ... | 477 | Mountain Mint, ... | 669 |
| Medeola, ... | 350 | Mouse-ear, ... | 766 |
| Medicago, ... | 496 | Mud Plantain, ... | 327 |
| Meibomia bracteosa, ... | 502 | Mudwort, ... | 681 |
| canadensis, ... | 504 | Muhlenbergia, ... | 220 |
| canescens, ... | 502 | Mulberry, Red, ... | 414 |
| dillenii, ... | 503 | Mustard, Black, ... | 462 |
| grandiflora, ... | 500 | Hedge, ... | 462 |
| kevigata, ... | 503 | Tower, ... | 463 |
| marilandica, ... | 505 | Myosotis, ... | 659 |
| michauxii, ... | 501 | Myrica, ... | 395 |
| nudiflora, ... | 500 | Myriophyllum, ... | 587 |
| obtusa, ... | 505 | Myrtle, Sand, ... | 615 |
| paniculata, ... | 502 | Wax, ... | 396 |
| pauciflora, ... | 501 | | |
| rigida, ... | 504 | Nabalus, ... | 723 |
| sessilifolia, ... | 501 | Najas, ... | 165 |
| stricta, ... | 501 | Nelumbo, ... | 446 |
| viridiflora, ... | 503 | Nepeta, ... | 662 |
| Melampyrum, ... | 689 | Nettle, False, ... | 415 |
| Melanthium, ... | 342 | Hedge, ... | 667 |
| Melilotus, ... | 495 | Horse, ... | 675 |
| Melilot, Yellow, ... | 495 | Slender, ... | 415 |
| White, ... | 495 | Stinging, ... | 414 |
| Menispermum, ... | 459 | Wood, ... | 415 |
| Mentha, ... | 673 | New Jersey Tea, ... | 546 |
| Menyanthes, ... | 644 | Nightshade, ... | 674 |
| Mercury, Three-seeded, ... | 526 | Enchanter's, ... | 585 |
| Mermaid-weed, ... | 586 | Nimble Will, ... | 221 |
| Mertensia, ... | 658 | Ninebark, ... | 477 |
| Mesadenia, ... | 776 | Noncsuch, ... | 496 |
| Micranthemum, ... | 713 | Nut Rush, ... | 282 |
| Micranthemum, ... | 681 | Nuttall, Thomas, ... | 524, 717 |
| Middle District, ... | | Nymphæa, ... | 444 |
| 80, 214, 447, 453, 497, 550, 601, ... | 730 | Nyssa, ... | 603 |
| Milkweed, ... | 647 | | |
| Milkwort, ... | 520 | Oak, Bartram's, ... | 411 |
| Sea, ... | 633 | Basket, ... | 410 |
| Milfoil, ... | 587 | Black, ... | 405 |
| Millet Grass, Pursh's, ... | 188 | Black Jack, ... | 407 |
| Mimulus, ... | 670 | Britton's, ... | 412 |
| Mint, ... | 674 | Chestnut, ... | 410 |
| Mountain, ... | 669 | Pin, ... | 405 |
| Mist Flower, ... | 738 | Post, ... | 409 |
| Mistletoe, ... | 416 | Red, ... | 404 |
| Mitchella, ... | 703 | Rock Chestnut, ... | 410 |
| | | Rudkin's, ... | 411 |

| | PAGE. | | PAGE. |
|-------------------------------|-------|----------------------------|-------|
| Oak, Scarlet, ... | 405 | Panicum columbianum, ... | 206 |
| Scrub, ... | 407 | commonsianum, ... | 205 |
| Scrub Chestnut, ... | 410 | commutatum, ... | 208 |
| Spanish, ... | 406 | condensum, ... | 197 |
| Swamp Post, ... | 409 | cubense, ... | 196 |
| Swamp White, ... | 409 | cryptanthum, ... | 210 |
| White, ... | 408 | depauperatum, ... | 198 |
| Willow, ... | 408 | dichotomum, ... | 199 |
| Oat Grass, ... | 231 | dichotomiflorum, ... | 195 |
| Obolaria, ... | 643 | ensifolium, ... | 207 |
| Oenothera, ... | 583 | hemitomon, ... | 194 |
| Oldenlandia, ... | 702 | huachuca, ... | 203 |
| Onoclea, ... | 137 | lanuginosum, ... | 204 |
| Onosmodium, ... | 659 | latifolium, ... | 211 |
| Ophioglossum, ... | 122 | leucothrix, ... | 202 |
| Opulaster, ... | 477 | lindheimeri, ... | 202 |
| Opuntia, ... | 573 | linearifolium, ... | 198 |
| Orache, Halberd-leaved, ... | 429 | lucidum, ... | 200 |
| Sea Beach, ... | 430 | mattamuskeetense, ... | 201 |
| Orange Grass, ... | 557 | meridionale, ... | 203 |
| Orchis, Crane-fly, ... | 378 | microcarpon, ... | 200 |
| Orchis, Crested Yellow, ... | 367 | oligosanthes, ... | 209 |
| Fringeless Purple, ... | 369 | oricola, ... | 204 |
| Green Fringed, ... | 369 | philadelphicum, ... | 195 |
| Green Wood, ... | 365 | polyanthes, ... | 208 |
| Large Purple Fringed, ... | 369 | pseudopubescens, ... | 205 |
| Pale-green, ... | 364 | scabriusculum, ... | 210 |
| Ragged, ... | 369 | scoparium, ... | 209 |
| Showy, ... | 364 | scribnerianum, ... | 209 |
| Small Purple Fringed, ... | 369 | sphærocarpon, ... | 207 |
| Snowy, ... | 366 | spretum, ... | 202 |
| Southern Yellow, ... | 365 | stipitatum, ... | 197 |
| White Fringed, ... | 368 | tennesseense, ... | 203 |
| Yellow Fringed, ... | 367 | thinium, ... | 207 |
| Orontium, ... | 317 | tsugetorum, ... | 206 |
| Osmunda, ... | 124 | verrucosum, ... | 194 |
| Ostrya, ... | 400 | villosissimum, ... | 204 |
| Oxalis, ... | 516 | virgatum, ... | 196 |
| Ox-eye, ... | 768 | wrightianum, ... | 201 |
| Oxycoccus, ... | 627 | Panicularia, ... | 240 |
| Oxygraphis, ... | 457 | Pansy, Field, ... | 572 |
| Oxypolis, ... | 600 | Papaver, ... | 460 |
| | | Papaw, ... | 448 |
| Painted Cup, ... | 687 | Parietaria, ... | 416 |
| Panax, ... | 590 | Parker, C. F., ... | 324 |
| Panicum, ... | 189 | Parnassia, ... | 470 |
| Panicum aciculare, ... | 199 | Parsnip, ... | 591 |
| aculeatum, ... | 210 | Cow, ... | 601 |
| addisoni, ... | 205 | Meadow, ... | 595 |
| agrostoides, ... | 196 | Purple Meadow, ... | 599 |
| amarum, ... | 196 | Water, ... | 597 |
| anceps, ... | 198 | Parsonia, ... | 576 |
| angustifolium, ... | 199 | Partridge Berry, ... | 703 |
| ashei, ... | 208 | Paspalum, ... | 185 |
| barbulatum, ... | 200 | Pea, Beach, ... | 510 |
| boscii, ... | 211 | Butterfly, ... | 511 |
| cærulescens, ... | 200 | Milk, ... | 512 |
| capillare, ... | 195 | Spurred Butterfly, ... | 510 |
| clandestinum, ... | 211 | Pea-nut, Wild, ... | 511 |
| clutei, ... | 191 | Peach, ... | 490 |

| | PAGE. | | PAGE. |
|--|----------|----------------------------|-------|
| Pearl-wort, ... | 439 | Pluchea, ... | 765 |
| Pedicularis, ... | 687 | Plum Beach, ... | 491 |
| Pellitory, ... | 416 | Chickasaw, ... | 491 |
| Peltandra, ... | 315 | Wild, ... | 491 |
| Pencil-flower, ... | 499 | Poa, ... | 239 |
| Pennyroyal, ... | 668 | Podophyllum, ... | 459 |
| False, ... | 664 | Pogonia, Rose, ... | 370 |
| Pennywort, ... | 592, 643 | Spreading, ... | 370 |
| Penstemon, ... | 678 | Whorled, ... | 371 |
| Penthorum, ... | 470 | Poison Ivy, ... | 538 |
| Pepperbush, Sweet, ... | 608 | Oak, ... | 538 |
| Pepper-grass, ... | 465 | Sumac, ... | 536 |
| Pepper-root, ... | 465 | Poke, ... | 434 |
| Peranium, ... | 376 | Polanisia, ... | 466 |
| Persimmon, ... | 634 | Polemonium, ... | 657 |
| Perularia, ... | 364 | Polycodium, ... | 624 |
| Phalaris, ... | 216 | Polygala, ... | 520 |
| Phaseolus, ... | 513 | Polygala ambigua, ... | 522 |
| Phegopteris, ... | 136 | brevifolia, ... | 521 |
| Philotria, ... | 173 | cruciata, ... | 521 |
| Phlox, ... | 656 | incarnata, ... | 522 |
| Phoradendron, ... | 416 | lutea, ... | 520 |
| Phragmites, ... | 235 | mariana, ... | 523 |
| Phryma, ... | 697 | nuttallii, ... | 523 |
| Physalis, ... | 675 | paucifolia, ... | 525 |
| Phytolacca, ... | 434 | polygama, ... | 524 |
| Pickrel Weed, ... | 326 | senega, ... | 524 |
| Pickering, Chas., ... | 653 | verticillata, ... | 522 |
| Pieris, ... | 618 | viridescens, ... | 523 |
| Pig-nut, ... | 398 | Polygonum arifolium, ... | 426 |
| Pigweed, ... | 433 | atlanticum, ... | 425 |
| Pimpernel, False, ... | 680 | aviculare, ... | 424 |
| Water, ... | 631 | careyi, ... | 422 |
| Pine, Ground, see Ground Plum, ... | | convolvulus, ... | 420 |
| Jersey, ... | 147 | eciliatum, ... | 423 |
| Old-field, ... | 150 | emersum, ... | 421 |
| Pitch, ... | 148 | erectum, ... | 424 |
| Pond, ... | 149 | hydropiper, ... | 421 |
| Short-leaved, ... | 147 | hydropiperoides, ... | 422 |
| White, ... | 146 | lapathifolium, ... | 419 |
| Yellow, ... | 147 | maritimum, ... | 422 |
| Pine Barrens, ... | | opelousanum, ... | 422 |
| 61, 125, 148, 151, 356, 520, 530, 620, ... | 731 | pennsylvanicum, ... | 422 |
| Pine Sap, ... | 611 | persicaria, ... | 419 |
| Pinweed, ... | 562 | prolificum, ... | 425 |
| Pink, Deptford, ... | 435 | punctatum, ... | 423 |
| Moss, ... | 657 | robustius, ... | 423 |
| Sea, ... | 636 | sagittatum, ... | 426 |
| Pinus, ... | 146 | scandens, ... | 426 |
| Pipewort, ... | 324 | setaceum, ... | 424 |
| Pipsissewa, ... | 610 | tenue, ... | 425 |
| Pitcher Plant, ... | 467 | virginianum, ... | 424 |
| Plantago, ... | 698 | Polygonatum, ... | 349 |
| Plantain, ... | 698 | Polygonella, ... | 427 |
| Indian, ... | 776 | Polygonum, ... | 421 |
| Mud, ... | 327 | Polypodium, ... | 129 |
| Rattlesnake, ... | 376 | Polypody, ... | 129 |
| Robbin's, ... | 762 | Polystichum, ... | 133 |
| Water, see Water Plantain, ... | | Pondweed, ... | 162 |
| Platanus, ... | 474 | Pontederia, ... | 326 |

| | PAGE. | | PAGE. |
|-------------------------------|-------|---------------------------|-------|
| Poplar Swamp, ... | 391 | Quercus triloba, ... | 406 |
| Silver, ... | 390 | velutina, ... | 405 |
| Tulip, ... | 448 | Quill Wort, ... | 144 |
| Populus, ... | 391 | Radicula, ... | 463 |
| Porteranthus, ... | 478 | Rafinesque, C. S., ... | 573 |
| Portulaca, ... | 435 | Ragweed | 725 |
| Potamogeton, ... | 162 | Rannuculus | 450 |
| Potamogeton americanus, ... | 163 | Raspberry Black cap | 478 |
| amplifolius, ... | 162 | Rattle box | 497 |
| confervoides, ... | 163 | Rattlesnake master, ... | 594 |
| dimorphus | 164 | Plantain, ... | 376 |
| diversifolius | 164 | Root | 723 |
| epihydus, ... | 162 | Weed | 722 |
| oakesianus | 162 | Redbud | 493 |
| pectinatus | 164 | Redroot | 354 |
| perfoliatus | 163 | Red-top | 225 |
| pulcher | 162 | Tall, ... | 236 |
| pusillus | 164 | Redfield, J. H. | 30 |
| Potato, Wild | 653 | Reed | 235 |
| Potentilla | 475 | Bur see Bur-reed. | |
| Poverty Grass | 217 | Sea Sand | 228 |
| Prickly Pear | 573 | Pine Barren | 228 |
| Primrose | 583 | Salt | 233 |
| Proserpinaca | 586 | Reed grass, ... | 227 |
| Prunella | 666 | Rhamnus | 546 |
| Prunus | 491 | Rhexia | 576 |
| Psedera | 548 | Rhododendron | 614 |
| Psilocarya | 265 | Rhus | 536 |
| Ptelea | 519 | Ribes | 473 |
| Pteridium | 130 | Ribwort, ... | 698 |
| Pteris | 130 | Rice, Wild | 214 |
| Ptilimnium | 598 | Rice Cut-grass, ... | 216 |
| Puccinellia, ... | 243 | Robina, ... | 475 |
| Pursh, Fred'k, ... | 339 | Rocket, Sea | 463 |
| Purslane | 435 | Rosa | 485 |
| Marsh | 580 | Rose Glossy | 485 |
| Sea | 35 | Low | 485 |
| Putty-root | 378 | Swamp | 485 |
| Pyrola | 609 | Sweetbrier | 476 |
| Pyxidanthera | 629 | Rotala | 574 |
| Pyxie | 620 | Rudbeckia | 769 |
| Quaker-Lady | 701 | Rue, Goat's, ... | 498 |
| Quercus | 404 | Meadow | 458 |
| alba, ... | 408 | Ruellia | 696 |
| bicolor | 409 | Rumex | 421 |
| brittoni | 412 | Ruppia | 165 |
| coccinea, ... | 405 | Rush Awl-leaved, ... | 332 |
| heterophylla | 411 | Bayonet | 333 |
| ilicifolia | 407 | Beaked | 277 |
| hyrata | 409 | Bristly | 332 |
| marilandica | 407 | Bull | 269 |
| michauxii | 410 | Canada | 335 |
| palustris, ... | 405 | Chair-maker's | 269 |
| phellos | 408 | Club, ... | 267 |
| prinus, ... | 410 | Common | 329 |
| prinoides | 410 | Forked | 331 |
| rubra | 404 | Grass-leaved | 332 |
| rudkini | 411 | Greene's | 331 |
| stellata | 409 | Horned | 276 |

| | PAGE. | | PAGE. |
|------------------------------|-------|-----------------------------|-------|
| Rush Jointed | 334 | Sanicle, White. | 738 |
| New Jersey | 334 | Sanicula | 593 |
| Nut | 282 | Sapponaria, ... | 436 |
| Proliferous | 333 | Sarothra | 557 |
| Scirpus-like, ... | 335 | Sarracenia | 467 |
| Scouring | 138 | Sarsaparilla, Bristly | 590 |
| Sharp-fruited | 336 | Wild | 589 |
| Sharp-fronted | 336 | Sassafras | 459 |
| Slender | 331 | Saururus | 390 |
| Spike, ... | 258 | Savastana | 216 |
| Toad | 330 | Saxifraga | 471 |
| Food | 330 | Saxifrage, Early. | 471 |
| Twig | 282 | Golden | 472 |
| Weak | 336 | Swamp | 471 |
| Wood | 336 | St. Andrews Cross | 552 |
| Rush-grass, ... | 222 | St. John's Wort, ... | 553 |
| Rye, Wild | 245 | Pink, ... | 557 |
| Rynchospora | 275 | St. Peter's Wort | 552 |
| Rynchospora alba | 277 | Scheuchzeria | 167 |
| axillaris | 280 | Schizaea, ... | 125 |
| cymosa | 281 | Schwalbea | 687 |
| filifolia | 279 | Scirpus | 266 |
| fusca | 280 | Scirpus americanus, ... | 269 |
| glomerata | 279 | atrovirens | 271 |
| gracilentia, ... | 277 | cyperinus, ... | 272 |
| inundata | 276 | debilis, ... | 268 |
| knieskernii, ... | 278 | eriphorum | 273 |
| leptocarpa | 279 | fluvialis, ... | 271 |
| macrostachya, ... | 276 | georgianus | 271 |
| microcephala | 280 | lineatus, ... | 272 |
| oligantha | 277 | longi | 272 |
| pallida | 278 | nanus, ... | 267 |
| rariflora, ... | 281 | olneyi | 269 |
| smallii | 279 | paludosus, ... | 271 |
| torreyana | 281 | planifolius | 268 |
| Sabatia, ... | 638 | robustus | 270 |
| Sage | 667 | setosus | 269 |
| Sagina | 439 | smithii | 269 |
| Sagittaria | 169 | subterminalis | 268 |
| Salicornia | 430 | torreyi | 270 |
| Salix | 392 | validus | 270 |
| Salomonina | 349 | Scleranthus | 437 |
| Salsola | 433 | Scleria | 282 |
| Saltwort, ... | 433 | Sclerolepis | 731 |
| Salvia | 667 | Scorpius Grass | 659 |
| Sambucus, ... | 708 | Scouring Rush, ... | 138 |
| Samolus | 631 | Scrophularia, ... | 678 |
| Sand Bur | 214 | Sculleap | 665 |
| Sand Myrtle | 615 | Scutellaria, ... | 664 |
| Sand Reed, Sea | 228 | Sea Blight | 432 |
| Sand Spurry | 436 | Sea Lavender | 633 |
| Salt Marsh | 442 | Sea Pink | 639 |
| Sandwort, Blunt-leaved | 441 | Sea Purslane | 435 |
| Pine Barren, ... | 440 | Sea Rocket | 463 |
| Salt Marsh, ... | 442 | Sedges (Carex), ... | 290 |
| Sea Beach | 441 | Sedge, Autumnal | 265 |
| Thyme-leaved, ... | 437 | Bristling | 253 |
| Sanguinaria, ... | 461 | Chestnut | 266 |
| Sanguisorba, ... | 484 | Hair-like | 265 |
| Sanicle | 593 | Globose | 254 |

| | PAGE. | | PAGE. |
|--------------------------|-------|--------------------------------|----------|
| Sedge, Gray's | 255 | Solidago nemoralis, ... | 751 |
| Lancaster | 253 | odora | 747 |
| Low, ... | 250 | patula | 748 |
| Marsh | 251 | puberula | 745 |
| Michaux's, ... | 252 | rugosa, ... | 747 |
| Nuttall's | 250 | sempervirens | 746 |
| Pine Barren | 255 | serotina | 750 |
| Red-rooted, ... | 252 | speciosa | 743 |
| Rough | 254 | stricta | 746 |
| Shining | 250 | ulmifolia | 748 |
| Slender | 256 | uniligulata, ... | 750 |
| Small-toothed | 251 | Solomon's Seal | 349 |
| Straw-colored | 253 | Sonchus | 719 |
| Teasel-like | 254 | Sorghastrum | 184 |
| Toothed | 251 | Sorrel, Engelmänn's | 421 |
| Yellow | 249 | Horse | 419 |
| Seed Box, ... | 582 | Sorrel, Wood | 516 |
| Selaginella | 143 | Sow Thistle | 719 |
| Self-heal | 666 | Spanish Needle, ... | 774 |
| Senna, Wild | 494 | Sparganium | 159 |
| Senecio | 777 | Spartina | 232 |
| Sensitive-Kea | 493 | Spathyema, ... | 316 |
| Sericocarpus | 753 | Spatter Dock | 444 |
| Service-berry | 488 | Specularia | 715 |
| Sesuvium | 435 | Speedwell | 682 |
| Setaria | 213 | Sphenopholis, ... | 229 |
| Shad-bush | 488 | Spicewood | 460 |
| Shepherd's Purse | 462 | Spider wort | 325 |
| Sickle pod | 466 | Spigelia | 637 |
| Sicyos | 714 | Spike Rush, ... | 258 |
| Sida | 549 | Spikenard Star-flowered, ... | 348 |
| Silene, ... | 137 | Wild, ... | 348, 589 |
| Sisymbrium | 462 | Spiraea, ... | 477 |
| Sisyrinchium | 360 | Spirodela, ... | 318 |
| Sium, ... | 597 | Sporobolus, ... | 222 |
| Skunk Cabbage | 316 | Spring Beauty | 435 |
| Slipper Plant | 364 | Spurge, ... | 527 |
| Smart weed | 421 | Squaw Root | 695 |
| Smilax | 351 | Squaw-weed | 777 |
| Smith, Chas. E. | 569 | Stachys | 667 |
| Snake-head | 678 | Stagger-bush | 618 |
| Snakeroot, Black | 451 | Staphylea, ... | 545 |
| Button | 740 | Star Flower | 635 |
| Seneca | 524 | Star grass | 355 |
| Virginia | 418 | Starwort | 529 |
| Sneezeweed | 774 | Steironima | 632 |
| Solanum, ... | 675 | Stenophyllus | 265 |
| Solidago | 742 | Stipa | 219 |
| Solidago altissima | 751 | Stone crop | 470 |
| arguta | 750 | Stork's Bill | 514 |
| bicolor | 744 | Strawberry, Virginia | 481 |
| caesia | 744 | Strawberry-Bush | 542 |
| canadensis | 751 | Stickseed, Virginia | 658 |
| elliottii, ... | 748 | Strophostyles | 513 |
| erecta | 745 | Struthiopteris | 137 |
| fistulosa | 748 | Stylosanthes, ... | 499 |
| flexicaulis, ... | 744 | Sumac | 536 |
| gigantea | 750 | Sundews | 468 |
| juncea | 750 | Sundrops | 584 |
| neglecta | 749 | Sunflower | 769 |

| | PAGE. | | PAGE. |
|------------------------------|----------|-------------------------------|-------|
| Sunflower, Tickseed, ... | 774 | Urticastrum, ... | 415 |
| Swamp Pink | 340 | Utricularia | 688 |
| Sweet Bay | 446 | Uvularia | 343 |
| Sweet Cicely | 595 | Uvursy | 621 |
| Sweet Pepperbush | 60 | Vaccinium | 624 |
| Sweet Fern | 396 | Vagnera | 348 |
| Syndesmon | 454 | Valerianella | 713 |
| Synosma, ... | 776 | Vallisneria | 173 |
| Syntherisma | 188 | Venus' Looking-glass | 715 |
| Tanacetum | 727 | Veratrum | 342 |
| Tape Grass | 173 | Verbena, ... | 660 |
| Taxodium | 151 | Verbesina, ... | 771 |
| Tea, New Jersey | 546 | Vernonia, ... | 730 |
| Tearthumb | 426 | Veronica | 682 |
| Tecoma | 695 | Vervain | 660 |
| Teucrium, ... | 663 | Vetch, Marsh | 510 |
| Thalesia | 694 | Sensitive Joint, ... | 498 |
| Thalictrum, ... | 458 | Wild | 495 |
| Thaspium | 599 | Viburnum | 708 |
| Thistles | 778 | Vicia, ... | 495 |
| Thistle, Sow | 719 | Viola | 564 |
| Thorn, Dwarf | 489 | Viola, affinis, ... | 568 |
| Cockspur | 489 | blanda | 570 |
| Scarlet | 489 | brittoniana | 567 |
| Three Square | 269 | conspersa | 572 |
| Tickseed, Rose-colored | 771 | cucullata | 568 |
| Tick-trefoil, ... | 500 | emarginata | 570 |
| Tissa | 436, 442 | imbriatula, ... | 569 |
| Tilia | 548 | hirsutula | 568 |
| Tipularia | 378 | lanceolata, ... | 571 |
| Toad-flax, ... | 677 | lineariloba | 565 |
| False | 418 | pallens | 570 |
| Tobacco, Indian | 717 | palmata | 566 |
| Tofieldia | 337 | papilionacea | 568 |
| Touch-me-not | 545 | pedata | 565 |
| Tradescantia | 325 | prunulifolia, ... | 571 |
| Triadenum | 557 | pubescens, ... | 571 |
| Trichostema | 664 | rafineskuii | 572 |
| Tridens | 236 | rotundifolia | 570 |
| Trientalis | 633 | sagittata | 569 |
| Trifolium | 496 | scabriuscula, ... | 572 |
| Triglochin | 166 | sororia, ... | 567 |
| Trillium | 350 | striata | 572 |
| Triosteum | 711 | triloba | 566 |
| Triplasis | 236 | Violets | 565 |
| Tripsacum | 180 | Virginia Creeper | 548 |
| Trumpet Creeper | 695 | Virgin's Bower | 454 |
| Tsuga | 150 | Vitis | 546 |
| Tulip-tree | 448 | Wake-robin, Ill-scented | 350 |
| Tumbleweed | 433 | Nodding | 350 |
| Turkey-beard | 339 | Walnut, Black | 397 |
| Twayblade, Large | 377 | Washingtonia | 595 |
| Loesel's | 377 | Water Beech | 399 |
| Southern | 375 | Water Hemp | 434 |
| Twin Berry | 703 | Water Lily | 445 |
| Typha | 158 | Water Nymph | 165 |
| Ulmus | 412 | Water Parsnip, Hemlock | 597 |
| Unifolium | 349 | Water Plantain | 168 |
| Uniola | 239 | Dwarf, ... | 168 |
| Urtica | 415 | Water Shield, ... | 443 |

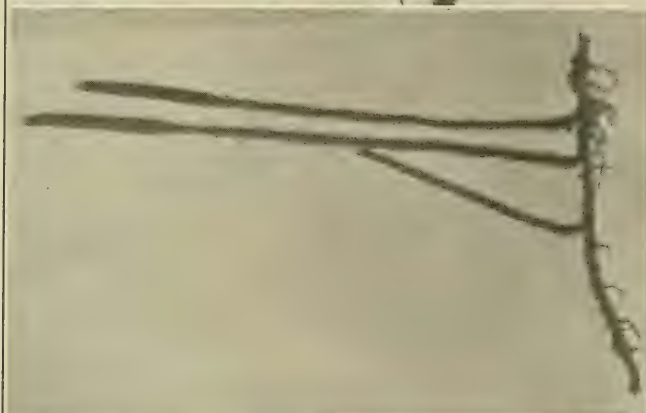
| | PAGE. | | PAGE. |
|----------------------------|----------|-------------------------|----------|
| Water Star Grass | 327 | Willow, Yellow | 393 |
| Water Starwort | 529 | Willow-herb | 582 |
| Water Weed | 173 | Willugbaeya, ... | 739 |
| Water-leaf, Virginia | 657 | Wind-flower | 453 |
| Waterwort | 558 | Winter-berry | 540 |
| Wax Myrtle | 396 | Wintergreen, ... | 608, 620 |
| Whitlow Grass | 462, 465 | Flowering, ... | 525 |
| Weeds, ... | 99 | Wister, C. J. | 379 |
| Wild Celery | 173 | Withe-rod, ... | 710 |
| Wild Ginger | 418 | Wolffia | 319 |
| 'Wild Leak | 344 | Wood Betony | 688 |
| Wild Parsnip | 591 | Wood Sorrel | 516 |
| Wild Pink | 437 | Woodwardia | 131 |
| Wild Poppy | 460 | Wool-grass | 272 |
| Wild Potato | 653 | Wormwood | 775 |
| Wild Rice | 214 | Xanthium | 726 |
| Wild Rye | 245 | Xerophyllum | 339 |
| Wild Yam | 358 | Xolisma, ... | 618 |
| Willow, Black | 392 | Xyris | 319 |
| Bebb's | 394 | Yam, Wild, ... | 358 |
| Glaucous, ... | 394 | Yarrow | 730 |
| Hart-leaved | 393 | Yellow-eyed Grass | 320 |
| Prairie | 394 | Zannichellia, ... | 165 |
| Sage | 394 | Zanthoxylum, ... | 518 |
| Sand-bar | 393 | Zizania, ... | 214 |
| Shining, ... | 395 | Zizia, ... | 595 |
| Silky, ... | 395 | Zostera | 166 |
| Virginia, ... | 472 | Zygadenis, ... | 342 |
| Water, ... | 697 | Zygadine, Coast | 342 |
| Weeping | 391 | | |

PLATES



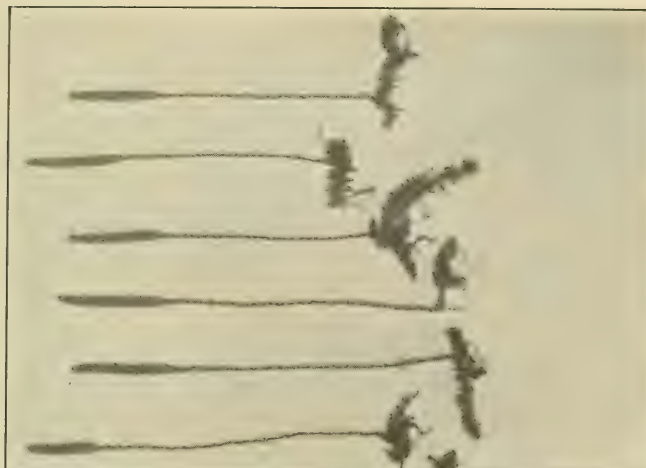
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1.
Lycopodium alopecuroides.



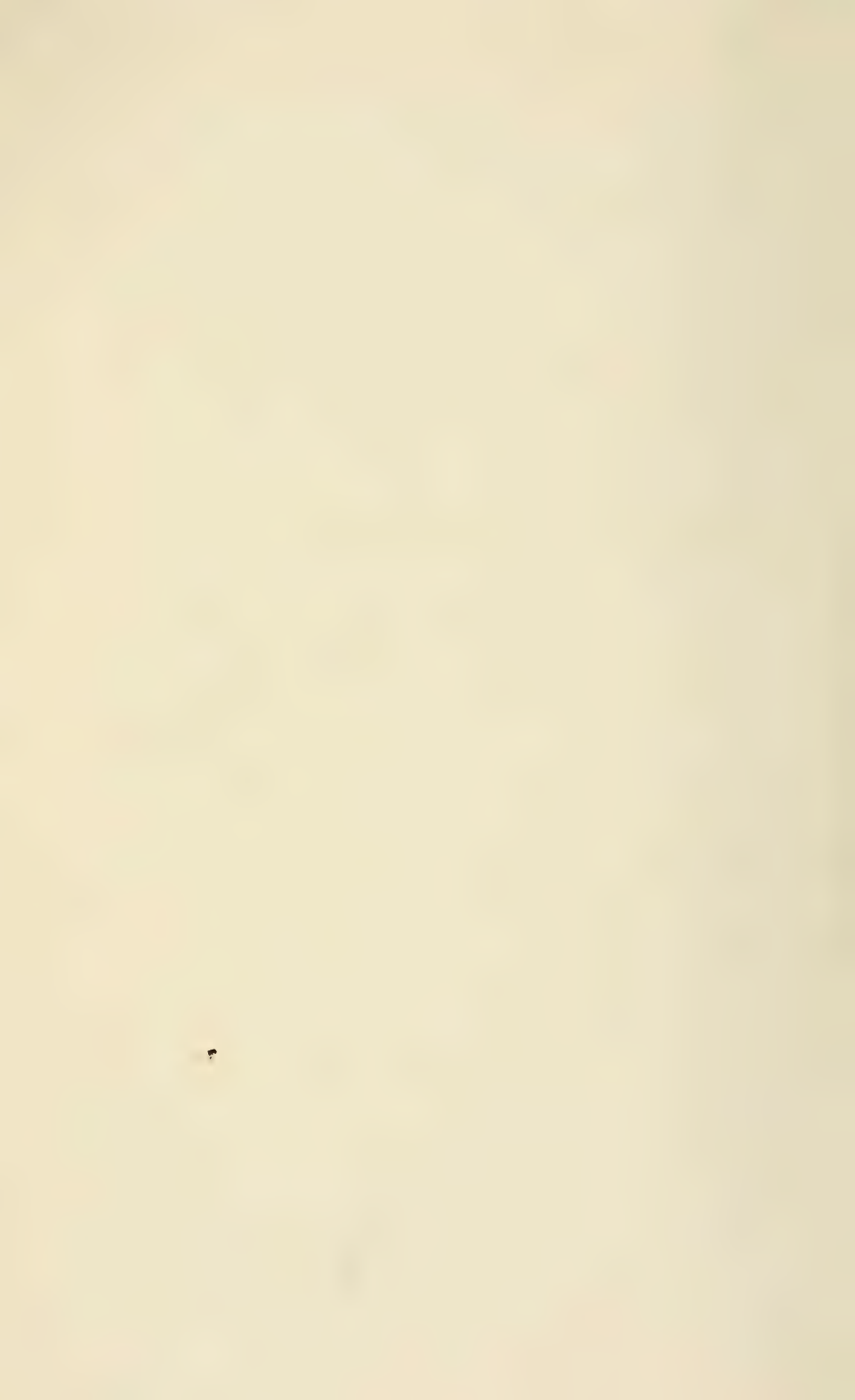
CLUB MOSSES.

2.
L. chapmanii.



3.
L. carolinianum.

x.5.





Original Photo.

1 and 2. PITCH PINE. *Pinus rigida*.

3 and 4. OLD-FIELD PINE. *P. taeda*.

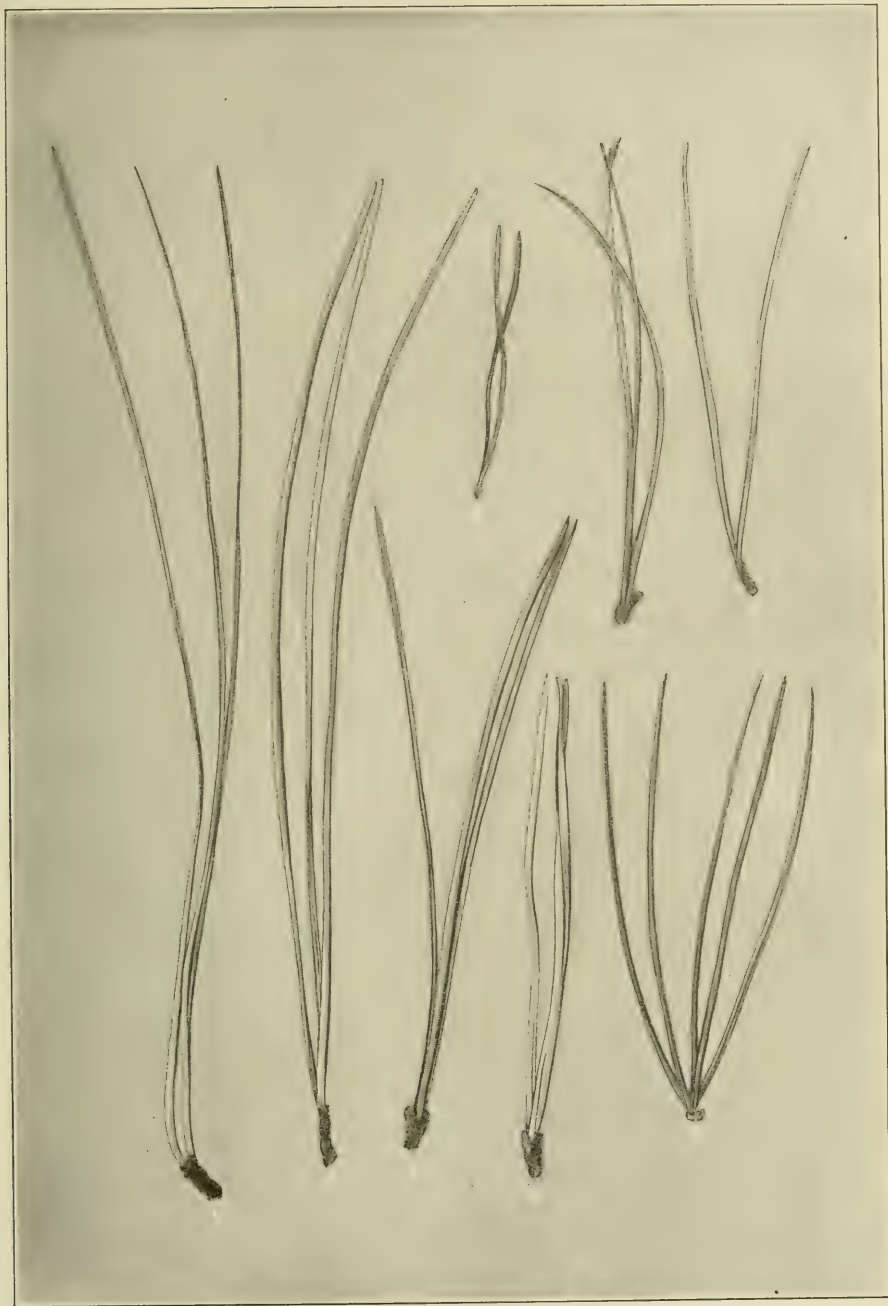
x.6.



Original Photo.

Nat. size.

- 1 and 2. YELLOW PINE. *P. echinata*.
3. JERSEY PINE. *P. virginiana*.
4. POND PINE. *P. serotina*.



Original Photo.

PINE LEAVES.

x.8.

- 1. *Pinus tæda*.
- 2. *P. serotina*.
- 3 and 4. *P. rigida*.

- 5. *P. strobus*.
- 6. *P. virginiana*.
- 7 and 8. *P. echinata*.



Photos by B. Long.

1. SEA-BEACH SANDWORT. *Ammodenia peplodes maritima*.
2. SEA SAND REED. *Ammophila arenaria*.



Original Photo.

Nat. size.

GRASSES.

1. *Tripsacum dactyloides*.
2. *Cœlorachis rugosa*.

3. *Stipa avenacea*.
4. *Andropogon corymbosus abbreviatus*.



Original Photo.

Nat. size.

GRASSES.

- | | |
|------------------------------------|--------------------------------------|
| 1. <i>Deschampsia flexuosa</i> . | 4. <i>Homalocenchrus oryzoides</i> . |
| 2. <i>Poa pratensis</i> . | 5. <i>Panicum longifolium</i> . |
| 3. <i>Muhlenbergia sylvatica</i> . | 6. <i>Syntherisma filiformis</i> . |



Original Photo.

Nat. size.

GRASSES.

- | | | |
|-------------------------------------|----------------------------------|------------------------------------|
| 1. <i>Amphicarpum amphicarpon</i> . | 4. <i>Aristida gracilis</i> . | 7. <i>Alopecurus geniculatus</i> . |
| 2. <i>Distychlis spicata</i> . | 5. <i>Danthonia spicata</i> . | 8. <i>Andropogon virginicus</i> . |
| 3. <i>Triplasis purpurea</i> . | 6. <i>Andropogon scoparius</i> . | 9. <i>Aristida dichotoma</i> . |



Original Photo.

x.6.

GRASSES.

- | | |
|--|--|
| 1. <i>Panicum dichotomum</i> . | 4. <i>Panicularia septentrionalis</i> . |
| 2. <i>P. virgatum</i> (part of panicle). | 5. <i>Eragrostis pectinacea</i> (part of panicle). |
| 3. <i>P. capillare</i> . | 6. <i>Gymnopogon ambiguus</i> . |



Original Photo.

Nat. size.

GRASSES.

- | | | |
|-------------------------------------|----------------------------------|----------------------------------|
| 1. <i>Calamagrostis cinnoides</i> . | 3. <i>Phalaris arundinacea</i> . | 5. <i>Brachelytrum erectum</i> . |
| 2. <i>Dactylis glomeratus</i> . | 4. <i>Holcus lanatus</i> . | |



Original Photo.

GRASSES.

x. 6.

1. *Sorghastrum nutans.*
2. *Phragmites phragmites.*
3. *Echinocloa walteri.*

4. *Elymus striatus.*
5. *Chaetocloa imberbis.*
6. *Elymus virginicus.*



Original Photo.

GRASSES.

x.7.

1. *Panicum condensum*.
2. *Aristida purpurascens*.
3. *Agrostis alba*.

4. *Cinna arundinacea*.
5. *Paspalum læve angustifolium*.
6. *P. glabratum*.



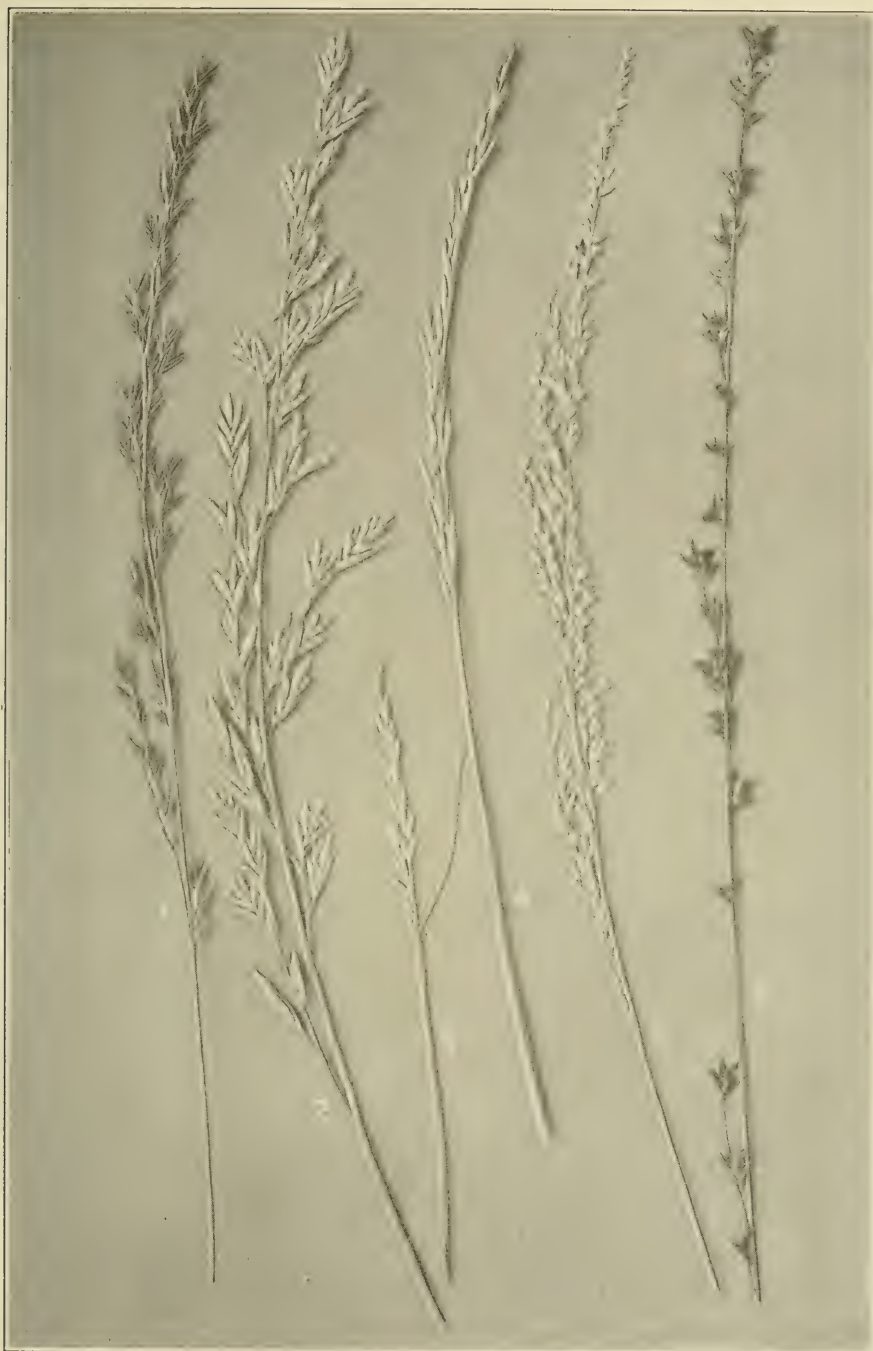
Original Photo.

GRASSES.

x.7.

1. *Calamovilfa brevipilis*.
2. *Eragrostis pilosa*.

3. *Tridens flavus*.
4. *Sporobolus serotinus*.



Original Photo.

GRASSES.

Nat. size.

1. *Festuca octoflora*.
2. *F. elatior*.
3. *Sporobolus vaginæflorus*.

4. *S. clandestinus*.
5. *Sphenopholis pallens*.
6. *Uniola laxa*.



Original Photo.

GRASSES.

x.6.

1. *Spartina cynosuroides*.
2. *Erianthus saccharoides*.
3. *Panicularia canadensis*.

4. *P. obtusa*.
5. *Spartina patens*.
6. *Cenchrus carolinensis*.



Original Photo.

Nat. size.

SEDGES.

1. *Cyperus lancastricensis*; 2. *C. hystericinus*; 3. *C. cylindricus*; 4. *C. ovularis*; 5. *C. fil. macilentus*; 6. *C. grayi*; 7. *C. pseudovegetus* (single cluster of heads); 8. *C. dentatus*; 9. *C. flavescens*; 10. *C. strigosus* (single head from large inflorescence); 11. *C. speciosus* (single head); 12. *C. erythrorhizos* (single head); 13. *C. rivularis*; 14. *C. diandrus*; 15. *C. nuttalli*; 16. *C. esculentus* (single head).



Original Photo.

Nat. size.

SEDGES AND SPIKE-RUSHES.

1. *Fimbristylis castaneus*; 2. *F. autumnalis*; 3. *Stenophyllis capillacea*; 4. *Dulichium arundinaceum*; 5. *Eleocharis interstincta*; 6. *E. quadrangulata*; 7. *E. robbinsii*; 8. *E. tuberculosa*; 9. *E. melanocarpa*; 10. *E. trichostata*; 11. *E. glaucescens*; 12. *E. rostellata*; 13. *E. tortilis*; 14. *E. ocreata*; 15. *E. acicularis*; 16. *E. torreyana*; 17. *E. obtusa*; 18. *E. tenuis*.



Original Photo.

Nat. size.

BEAKED-RUSHES.

1. *Rynchospora macrostachya* (part of inflorescence); 2. *R. knieskernii*;
3. *R. cymosa*; 4. *R. rariflora*; 5. *R. torreyana*; 6. *R. fusca*; 7. *R. glomerata*;
8. *R. axillaris*; 9. *R. oligantha*; 10. *R. pallida* and *R. alba*.



Original Photo.

Nat. size.

COTTON-GRASS, NUT-RUSHES, ETC.

- | | | |
|-----------------------------------|----------------------------------|-------------------------------|
| 1. <i>Eriophorum virginicum</i> . | 4. <i>Fuirena hispida</i> . | 7. <i>S. ret. torreyana</i> . |
| 2. <i>Cladium mariscoides</i> . | 5. <i>Eriophorum tenellum</i> . | |
| 3. <i>Scleria verticillata</i> . | 6. <i>Scleria triglomerata</i> . | |



Original Photo.

Nat. size.

SEDGES.

1. *Scirpus validus*; 2. *S. planifolius*; 3. *S. nanus*; 4. *S. debilis*; 5. *S. torreyanus*; 6. *S. subterminalis*; 7. *S. americanus*; 8. *S. olneyi*; 9. *S. atrovirens* (portion only); 10. *S. lineatus* (portion only); 11. *S. longii* (portion only); 12. *S. eriophorum* (portion only); 13. *S. cyperinus* (portion only).



Original Photo.

Nat. size.

SEDGES.

- | | |
|-----------------------------|--|
| 1. <i>Carex stipata</i> . | 5. <i>C. canescens disjuncta</i> . |
| 2. <i>C. vulpinoidea</i> . | 6. <i>C. crinita</i> . |
| 3. <i>C. muhlenbergii</i> . | 7. <i>Scirpus robustus</i> . |
| 4. <i>C. cephalophora</i> . | 8. <i>S. fluviatilis</i> (portion only). |



Original Photo.

SEDGES.

Nat. size.

1. *Carex lupulina*.
2. *C. bullata*.
3. *C. collinsii*.

4. *C. folliculata*.
5. *C. intumescens*.



Original Photo.

SEDGES.

Nat. size.

1. *Carex lurida.*
2. *C. comosa.*
3. *C. lanuginosa.*

4. *C. barrattii.*
5. *C. limosa.*
6. *C. lacustris.*

7. *C. walteriana.*



Original Photo.

Nat. size.

SEDGES.

- | | | |
|--------------------------------|--------------------------|--------------------------|
| 1. <i>Carex livida.</i> | 4. <i>C. tetanica.</i> | 7. <i>C. styloflexa.</i> |
| 2. <i>C. grisea.</i> | 5. <i>C. granularis.</i> | 8. <i>C. abscondita.</i> |
| 3. <i>C. lax. patulifolia.</i> | 6. <i>C. laxiculmis.</i> | |



Original Photo.

SEDGES.

Nat. size.

1. *Carex stricta*.
2. *C. triceps*.
3. *C. oblita*.

4. *C. buxbaumii*.
5. *C. trichocarpa*.
6. *C. swanii*

7. *C. vestita*.



Original Photo.

Nat. size.

SEDGES.

1. *Carex scoparia*; 2. *C. tribuloides*; 3. *C. silicia*; 4. *C. hormathodes*;
 5. *C. alata*; 6. *C. albolutescens*; 7. *C. straminea*; 8. *C. festucacea brevior*;
 9. *C. varia emmonsii*; 10. *C. interior*; 11. *C. atlantica*; 12. *C. pennsyl-
 vanica*; 13. *C. exilis*; 14. *C. leptalea harperi*; 15. *C. umbellata*.



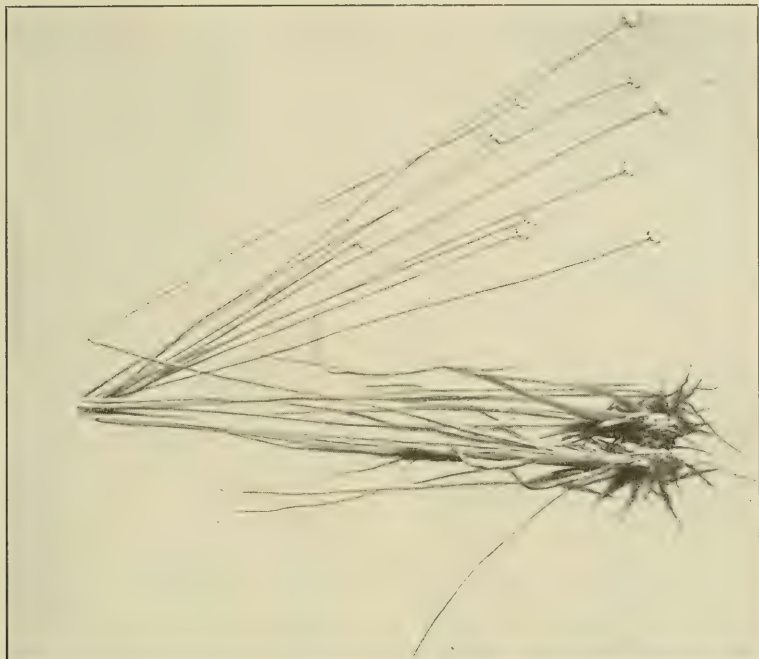
Photos by S. Brown.

PICKEREL WEED. *Pondetia cordata*.

GREEN ARROW ARUM. *Peltandra virginica*.



1.
Eriocaulon septangulare.



2.
E. decangulare.

PIPEWORTS.



Photos by B. Long.

1. PRICKLY PEAR. *Opuntia opuntia*.
2. SKUNK CABBAGE. *Spathyema foetida*.



From Painting by H. E. Stone.

SKUNK CABBAGE. *Spathyema foetida*.



Original Photo.

Nat. size.

RUSHES.

1. *Juncus tenuis*.
2. *J. buffonius*.
3. *J. gerardi*.

4. *J. effusus*.
5. *J. marginatus*.
6. *J. aristulatus*.

7. *J. dichotomus*.
8. *J. setaceus*.



Original Photo.

Nat. size.

RUSHES.

1. *Juncus acuminatus.*
2. *J. canadensis.*
3. *J. scirpoides.*

4. *J. militaris.*
5. *J. caesariensis.*
6. *J. pelocarpus.*



Photos by W. Stone.

1. VISCID ASPHODEL. *Tofieldia racemosa*.

2-3. BOG ASPHODEL. *Abama americana*.

4-5. GRASS PINK.

Limnorchis tuberosum.



Photos by W. Stone.

1. PYXIE. *Pyxidanthera barbulata*.

2. GOLD-CREST. *Lophiola americana*.



Photo by H. A. Pilsbry and W. Stone.

TURKEY-BEARD. *Xerophyllum asphodeloides*.



From Painting by H. E. Stone.

SWAMP PINK. *Helonias bullata*.



Photos by B. Long.

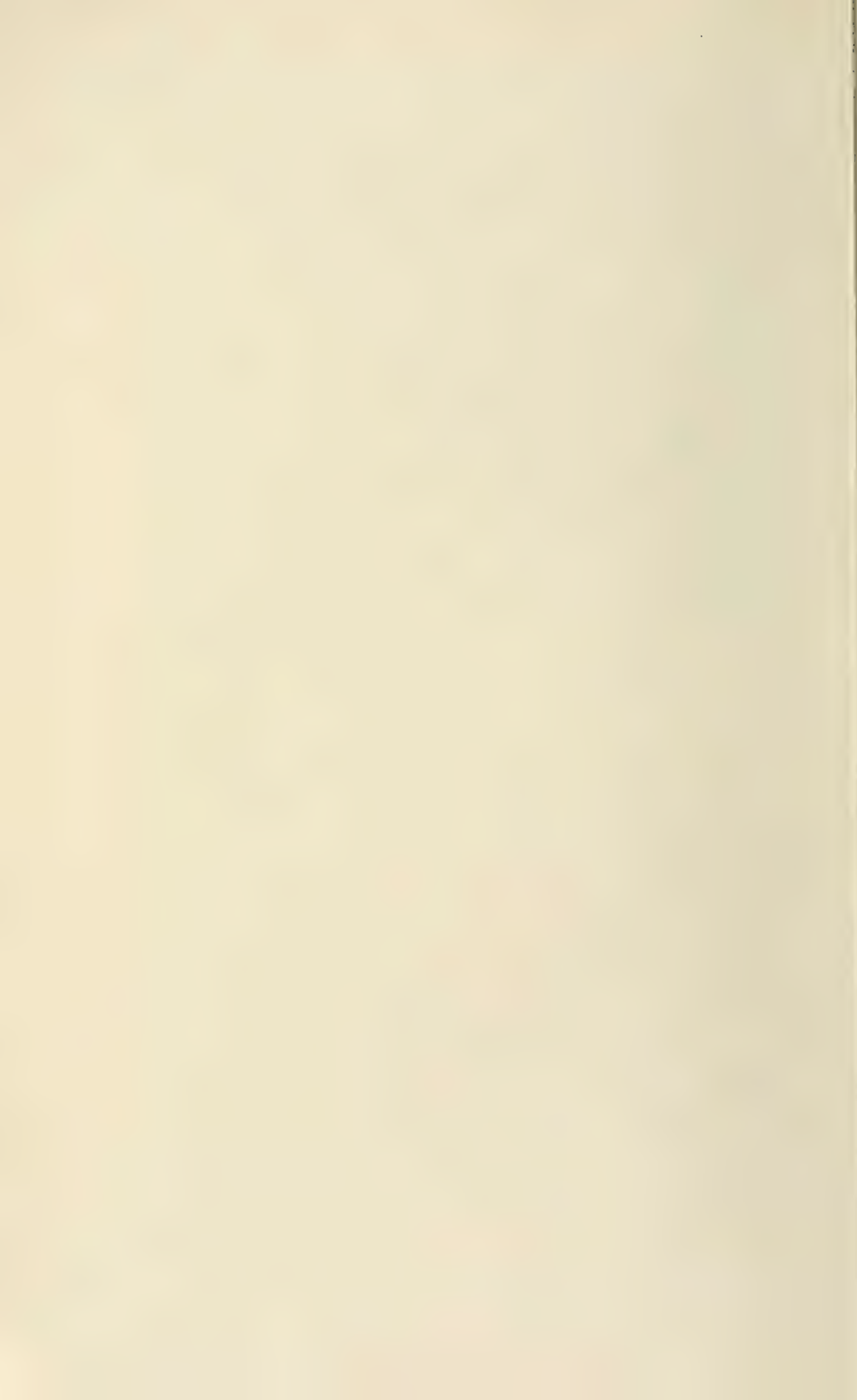
1. BLUE FLAG. *Iris versicolor*.

2. BLUE LUPINE. *Lupinus perennis*.



Photos by S. Brown.

1. FALSE LILY-OF-THE-VALLEY. *Unifolium canadense*.
2. ROUND-LEAVED WINTERGREEN. *Pyrola americana*.





Photos by B. Long.

1.
YELLOW LILY, *Lilium canadense*.



2.
JACK-IN-THE-PULPIT, *Arisaema triphyllum*.





From Painting by H. E. Stone.

'DOG-TOOTHED VIOLET.' *Erythronium americanum*.





Photos by B. Long.

1. 'DOG-TOOTHED VIOLET.' *Erythronium americanum*.
2. BLOOD ROOT. *Sanguinaria canadensis*.





From Painting by H. E. Stone.

MOCCASIN-FLOWER. *Cypripedium acaule*.





From Painting by H. E. Stone.

TWAY-BLADE. *Leptorchis liliifolia*.





From Painting by H. E. Stone.

SHOWY ORCHIS. *Galearis spectabilis.*





From Painting by H. E. Stone.

ORANGE FRINGED ORCHIS. *Blephariglottis ciliaris*.





From Painting by H. E. Stone.

GREEN FRINGED ORCHIS. *Blephariglottis lacera*.





From Painting by H. E. Stone.

SNOWY ORCHIS. *Gymnadeniopsis nivea*.





From Painting by H. E. Stone.

ROSE POGONIA. *Pogonia ophioglossoides*.





From Painting by H. E. Stone.

WHORLED POGONIA. *Isotria verticillata*.





From Painting by H. E. Stone.

RATTLESNAKE PLANTAIN. *Peramium pubescens.*





From Painting by H. E. Stone.

SLENDER LADIES' TRESSES. *Gyrostachys gracilis.*





From Painting by H. E. Stone.

NODDING LADIES' TRESSES. *Gyrøstachys cernua.*





From Painting by H. E. Stone.

CORAL ROOT. *Corallorhiza odontorhiza*.





Photos by S. Brown.
SPOTTED-STEM PHLOX. *Phlox maculata*.



"SWEET FERN." *Comptonia asplenifolia*.



Photos by S. Brown.

1. SLENDER GLASSWORT. *Salicornia europaea*.
2. BIGELOW'S GLASSWORT. *S. bigelovii*.
3. SEA-BEACH SANDWORT. *Ammodenia pep. maritima*.



Photos by S. Brown.

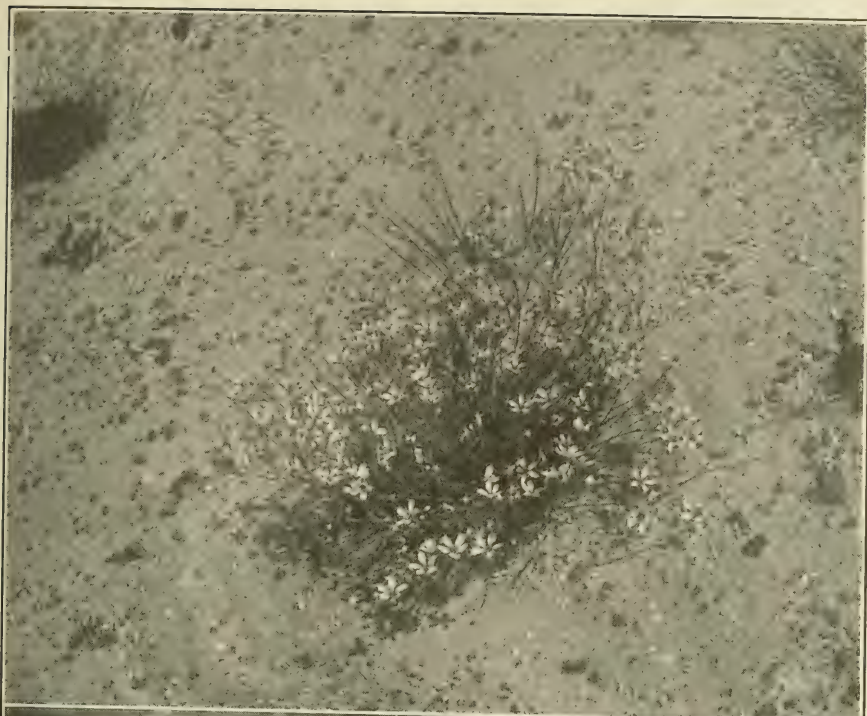
1. SEA ROCKET. *Cakile edentula*.

2. SEA BLIGHT. *Dondia maritima*.



Photos by S. Brown.

1. HALBERT-LEAVED ORACHE. *Atriplex hastata*.
2. SALTWORT. *Salsola kali*.



Photos by W. Stone.

1. PINE BARREN SANDWORT. *Arenaria caroliniana*.
2. WHITE AZALEA. *Azalea viscosa*.



From Painting by H. E. Stone.

WHITE WATER LILY. *Castalia odorata*.



From Painting by H. E. Stone.

SWAMP MAGNOLIA. *Magnolia virginiana.*



Photos by B. Long.

TULIP POPLAR. *Liriodendron tulipifera*.
PARTRIDGE-BERRY. *Mitchella repens*.



Photos by S. Brown.

1.
KIDNEY-LEAVED CROWFOOT.
Ranunculus abortivus.

2.
WILD COLUMBINE.
Aquilegia canadensis.



From Painting by H. E. Stone.

PITCHER PLANT. *Sarracenia purpurea*.



Photos by W. Stone.

LAUREL,
Kalmia latifolia.



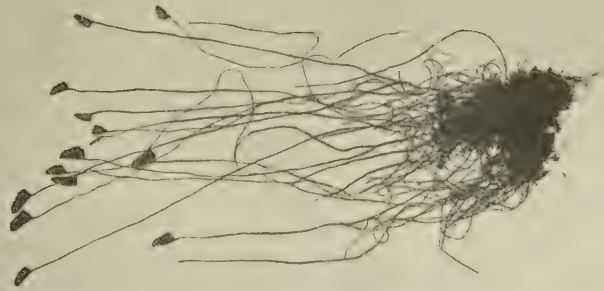
PITCHER PLANT, *Sarracenia purpurea*,
and
PIPEWORT, *Eriocaulon compressum*.



From Painting by H. E. Stone.

LONG-LEAVED SUNDEW. *Drosera longifolia*.

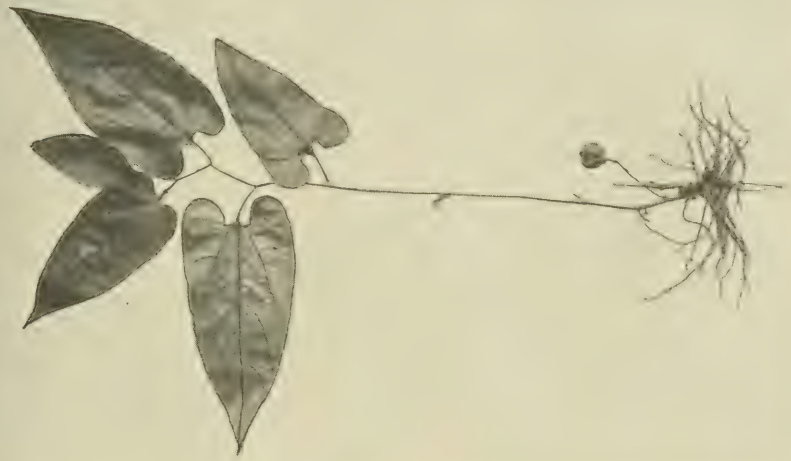




1.
CURLY GRASS.
Schizaea pusilla.



2.
THREAD-LEAVED SUNDEW.
Drosera filiformis.



3.
VIRGINIA SNAKE-ROOT.
Aristolochia serpentaria.



Photos by S. Brown.
CHOKE-BERRY. *Aronia nigra*.



BURNET. *Sanguisorba canadensis*.



Photos by S. Brown.

1. WILD INDIGO. *Baptisia tinctoria*.

2. PENCIL FLOWER. *Stylosanthes biflora*.



From Painting by H. E. Stone.

LUPINE. *Lupinus perennis.*



Photos by S. Brown.

1. WAND-LIKE BUSH CLOVER. *Lespedeza frutescens*.

2. HAIRY BUSH CLOVER. *L. hirta*.



From Painting by H. E. Stone.

RED CLOVER. *Trifolium pratense.*



Photos by S. Brown.

1. PINK WILD BEAN. *Strophostyles umbellata*.
2. GROUND-NUT. *Apios apios*.



From Painting by H. E. Stone.

CROSS-LEAVED MILKWORT. *Polygala cruciata.*



Drawings by H. E. Stone.

1. LOOSE-SPIKED MILKWORT. *Polygala ambigua*.
2. NUTTALL'S MILKWORT. *P. nuttallii*.
3. WHORLED MILKWORT. *P. verticillata*.



Drawings by H. E. Stone.

1. PINK MILKWORT. *Polygala incarnata*.
2. RACEMED MILKWORT. *P. polygama*.



Drawings by H. E. Stone.

1. SHORT-LEAVED MILKWORT. *Polygala brevifolia*.
2. FLOWERING WINTERGREEN. *P. paucifolia*.



Drawing by H. E. Stone.

ORANGE MILKWORT. *Polygala lutea.*



Drawings by H. E. Stone.

1. MARYLAND MILKWORT. *Polygala mariana*.
2. PURPLE MILKWORT. *P. viridescens*.



Photos by W. Stone.

CONRAD'S CROW-BERRY. *Corema Conradii*.



Photos by S. Brown.

1. POISON IVY. *Rhus radicans*.

2. VIRGINIA CREEPER. *Pseuderacemata quinquefolia*.



From Painting by H. E. Stone.

ROSE MALLOW. *Hibiscus moscheutos*.



Photos by S. Brown.

1. ORANGE GRASS. *Sarthra gentianoides*.

2. RATTLESNAKE MASTER. *Eryngium aquaticum*.



Original Photo.

Nat. size.

PINWEEDS.

- | | |
|----------------------------|--------------------------|
| 1. <i>Lechea villosa</i> . | 3. <i>L. minor</i> . |
| 2. <i>L. racemulosa</i> . | 4. <i>L. maritimum</i> . |
| 5. <i>L. leggetii</i> . | |



Photos by E. Long.

1. BLUE MARSH VIOLET. *Viola cucullata*.
2. SPRING BEAUTY. *Claytonia virginica*.



From Painting by H. E. Stone.

BIRD-FOOT VIOLET. *Viola pedata lineariloba*.



From Painting by H. E. Stone.

OVATE-LEAVED VIOLET. *Viola fimbriatula*.



From Painting by H. E. Stone.

ARROW-LEAVED VIOLET. *Viola sagittata.*



Photos by W. Stone.

1. PRIMROSE-LEAVED VIOLET. *Viola primulifolia*.

2. LANCE-LEAVED VIOLET. *V. lanceolata*.

3. THREAD-LEAVED SUNDEW. *Drosera filiformis*.

Showing insects attached to glands.



From Painting by H. E. Stone.

SWEET WHITE VIOLET. *Viola pallens*.



Drawings by H. E. Stone.

1. MUDWORT. *Limosella tenuifolia*.
2. UMBELLATE PENNYWORT. *Hydrocotyle umbellata*.
3. LILAEOPSIS. *Lilaeopsis lineata*.



From Painting by H. E. Stone.

SPOTTED WINTERGREEN. *Chimaphila maculata*.



Photos by S. Brown.

1. CASSANDRA. *Chamaedaphne calyculata*.
2. SWEET PEPPER-BUSH. *Clethra alnifolia*.



Photos by B. Long.

1. WITCH HAZEL. *Hamamelis virginiana*.
2. INDIAN PIPE. *Monotropa uniflora*.
- WINTERGREEN. *Gaultheria procumbens*.



Photos by H. Long.
RHODODENDRON. *Rhododendron maximum.*

WILD HYDRANGEA. *Hydrangea arborescens.*



From Painting by H. E. Stone.

PINK AZALEA. *Azalea nudiflora*.



Photos by S. Brown.

1. **BUTTON-BUSH.** *Cephalanthus occidentalis.*
2. **SAND MYRTLE.** *Dendrium buxifolium.*



Photos by S. Brown.

1. WINTERGREEN. *Gaultheria procumbens*.
2. CRANBERRY. *Oxycoccus macrocarpus*.



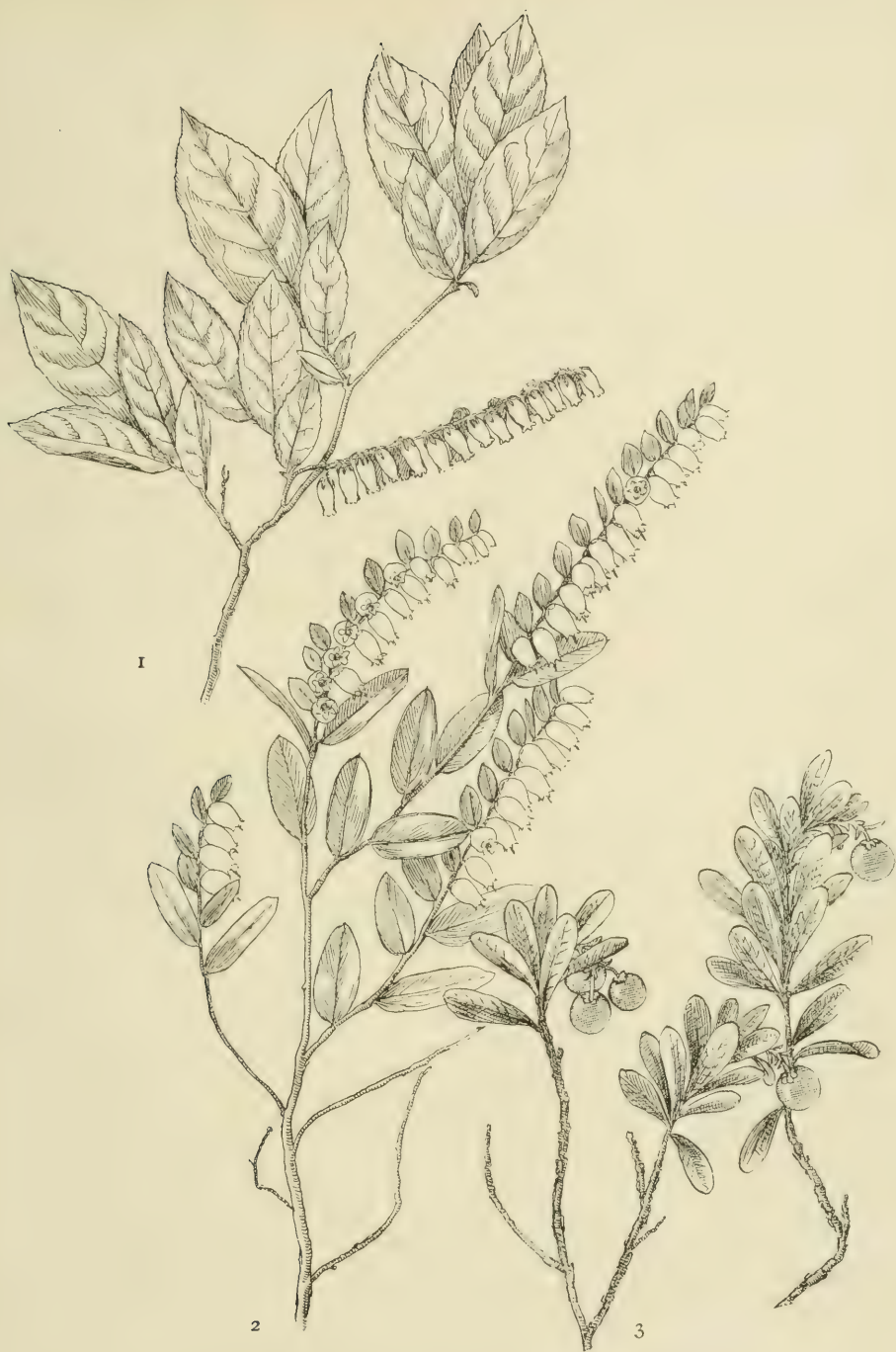
From Painting by H. E. Stone.

ARBUTUS. *Epigaea repens*.

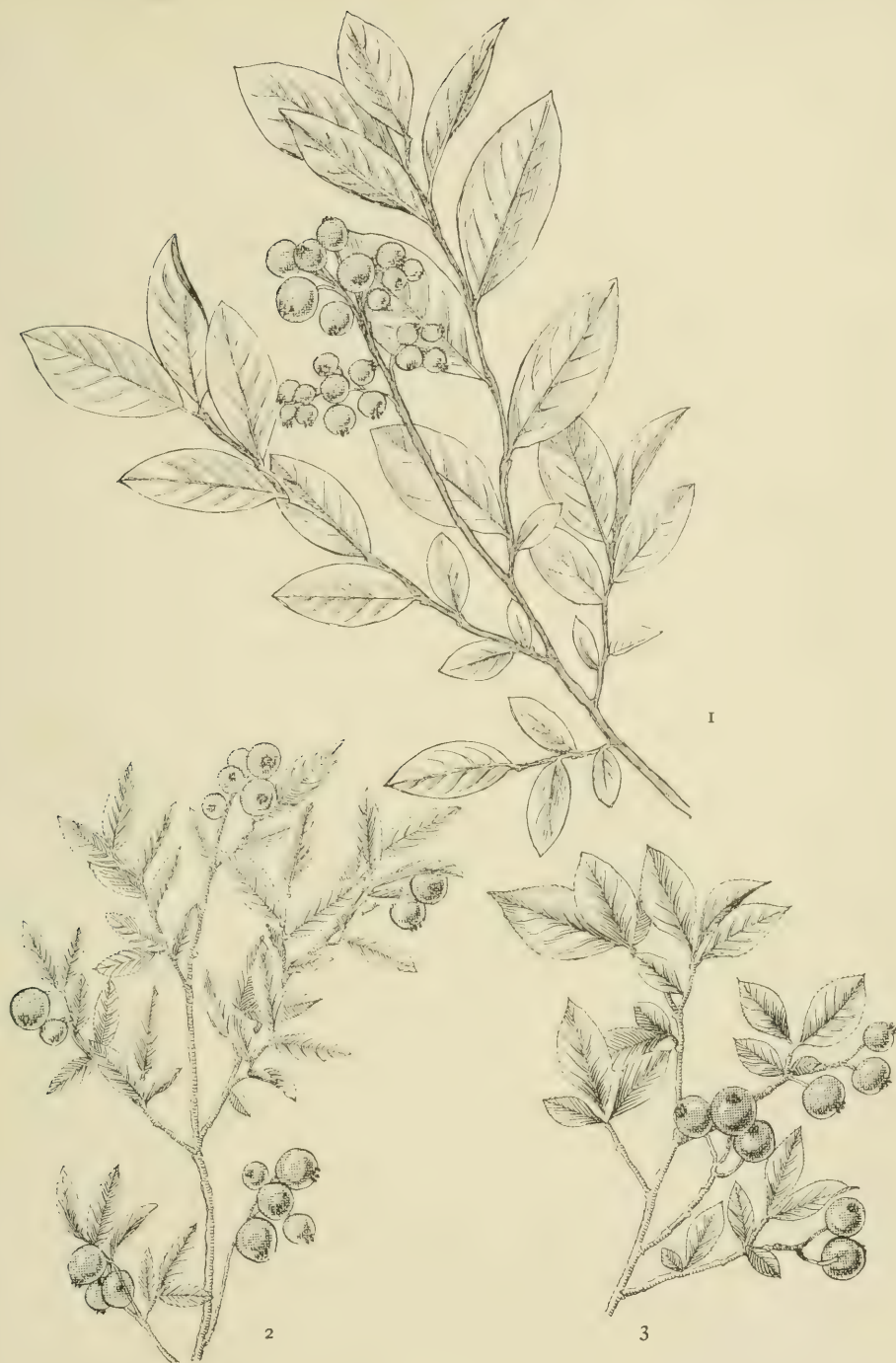


From Painting by H. E. Stone.

BEAR BERRY. *Arctostaphylos uva-ursi*.



1. SWAMP LEUCOTHOE. *Leucothoe racemosa*.
2. CASSANDRA. *Chamaedaphne calyculata*.
3. BEAR-BERRY. *Arctostaphylos uva-ursi*.



Drawings by H. E. Stone.

1. TALL BLUEBERRY. *Vaccinium corymbosum*.
2. NARROW-LEAVED BLUEBERRY. *V. pennsylvanicum*.
3. LOW BLUEBERRY. *V. vacillans*.



Drawings by H. E. Stone.

1. BLUE HUCKLEBERRY. *Gaylussacia frondosa*.
2. BLACK HUCKLEBERRY. *G. baccata*.
3. LEAFY-BRACTED HUCKLEBERRY. *G. dumosa*.



From Painting by H. E. Stone.

FRINGED GENTIAN. *Gentiana crinita*.



From Painting by H. E. Stone.

PINE BARREN GENTIAN. *Gentiana porphyrio*.



From Painting by H. E. Stone.

CLOSED GENTIAN. *Gentiana andrewsii.*



Photos by S. Brown.

1. SQUARE-STEMMED CENTAURY. *Sabatia angularis*.
2. LARGE MARSH CENTAURY. *S. dodecandra*.
3. SEA PINK. *S. stellaris*.



Photos by S. Brown.

1. PURPLE FOXGLOVE. *Gerardia purpurea*.
2. BARTONIA. *Bartonia virginica*.



Photos by S. Brown.
SWAMP LOOSESTRIFE. *Decodon verticillatus*.



BUTTERFLY-WEED. *Asclepias tuberosa*.



Photos by S. Brown.

HAIRY MILKWEED.
Asclepias pulchra.



SMOOTH ORANGE MILKWEED.
Asclepias lanceolata.



From Painting by H. E. Stone.

HORSE MINT. *Monarda punctata*.



From Painting by H. E. Stone.

SNAKE HEAD. *Chelone glabra*.



Drawings by H. E. Stone.

Nat. size.

BLADDERWORTS.

1. *Utricularia intermedia*.
2. *U. purpurea*.

3. *U. cornuta*.
4. *U. juncea*.

1

2

3



4

5

Drawings by H. E. Stone.

Nat. size.

BLADDERWORTS.

1. *Utricularia virgatula*.
2. *U. clandestina*.

3. *U. subulata*.
4. *U. cleistogama*.
5. *U. gibba*.



Drawing by H. E. Stone.

BLADDERWORTS.

1. *Utricularia fibrosa*.

2. *U. inflata*.



Drawings by H. E. Stone.

HAIRY RUELLIA. *Ruellia ciliosa*.



Drawings by H. E. Stone.

1. CLEAVERS. *Galium aparine*.

2. COAST BEDSTRAW. *G. hispidulum*.



I

Drawings by H. E. Stone.

1. *Galium circaeazans*.

2

2. *G. asprellum*.

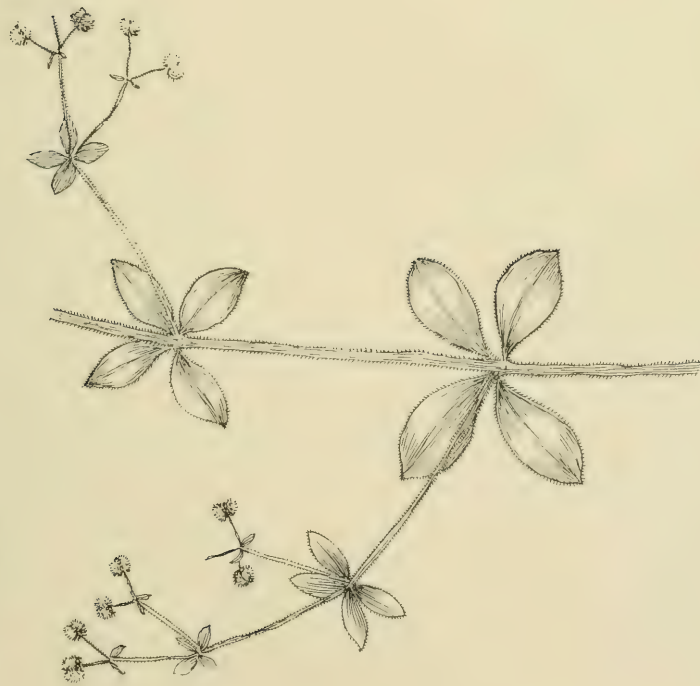
BEDSTRAWS.

3

3. *G. triflorum*.

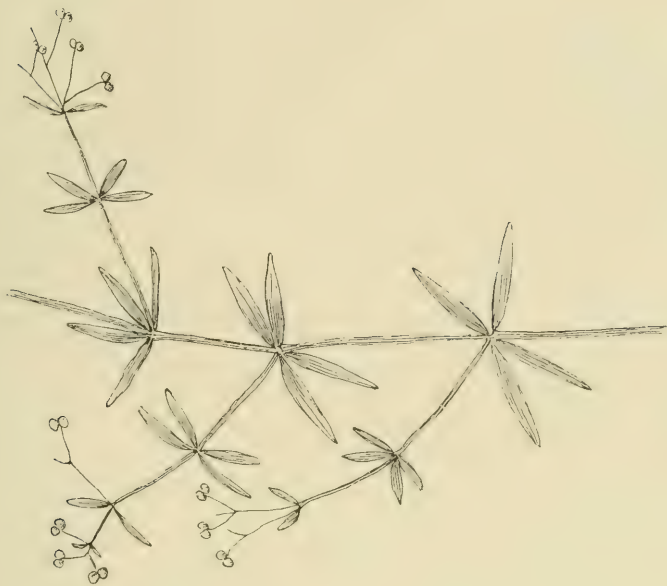
N. J. Plants.

PLATE CXVIII.



I
Drawings by H. E. Stone.

1. *Galium pilosum*.



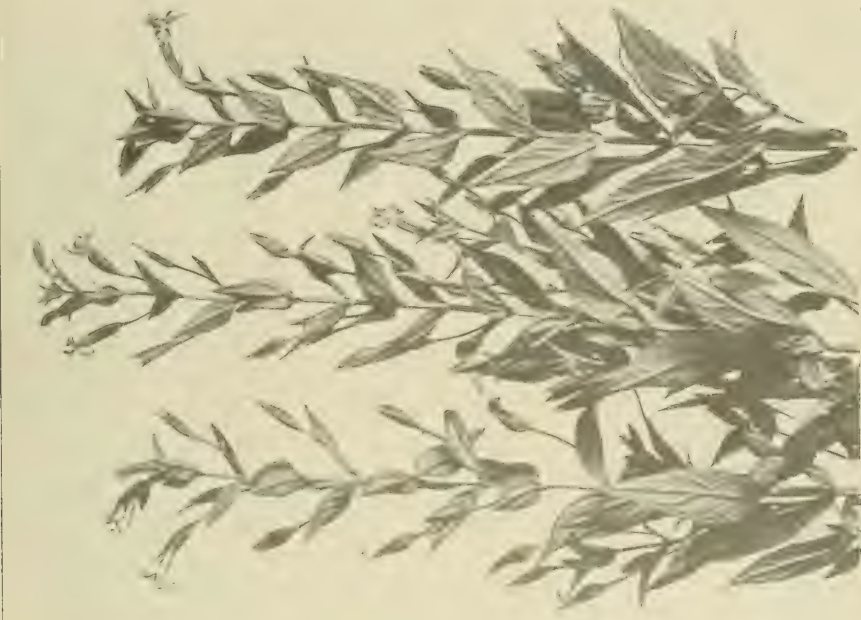
2

BEDSTRAWS.

2. *Galium tinctorium*.



Photos by S. Brown.
CARDINAL LOBELIA. *Lobelia cardinalis*.



MONKEY FLOWER. *Mimulus ringens*.

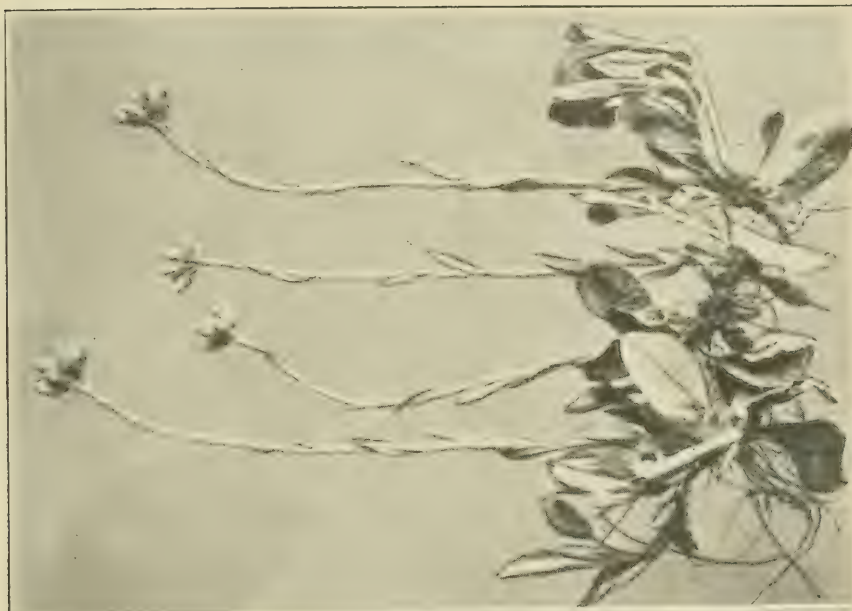


From Painting by H. E. Stone.

DOWNY LOBELIA. *Lobelia puberula*.



Photos by S. Brown. 1. GROUNDSEL-BUSH.
Baccharis halimifolia.



2. MOUSE-EAR EVERLASTING.
Antennaria plantaginifolia.



Photos by S. Brown.

1. SEASHORE GOLDENROD. *Solidago sempervirens*.



2. CLIMBING BONESET. *Willughbaea scandens*.



Photos by S. Brown.

1. PINE BARREN BONESET. *Eupatorium album*.

2. WILD SAGE. *Salvia lyrata*.



From Painting by H. E. Stone.

BONESET. *Eupatorium perfoliatum*.



From Painting by H. E. Stone.

STIFF-LEAVED ASTER. *Ionactis linariifolius*.



From Painting by H. E. Stone.

SWEET-SCENTED GOLDENROD. *Solidago odora.*



Photos by T. M. Lightfoot and W. Stone.

1. CEDAR SWAMP.
2. DRY PINE WOODS.



Photos by T. M. Lightfoot.

VIEWS OF THE WEST PLAINS.
LAUREL IN BLOOM.



Photos by W. Stone and T. M. Lightfoot.

1. FLOODED CRANBERRY BOG, WITH ROADWAY ON THE DYKE. STAFFORD'S FORGE.
2. SAND DUNES, AND BURIED FOREST. BELOW PIERMONT.



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